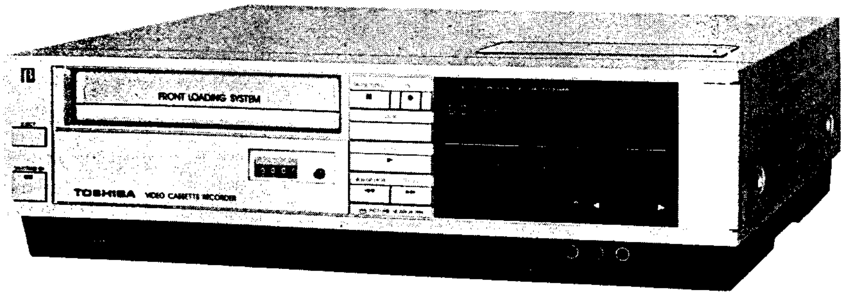
SERVICE DATA
FILE NO. 030-066

TOSHIBA
COLOUR VIDEO CASSETTE RECORDER
V-31



SPECIFICATIONS

General

Video recording system:	Head configuration 2-head rotary
Video signal:	CCIR standard, PAL colour
Storage temperature:	−20° to +60°C (−4° to +140°F)
Operating temperature:	5° to 40°C (41° to 104°F)
Antenna:	75-ohms external aerial terminal for VHF and UHF
Channel coverage:	VHF channels 2-12 UHF channels 21−69
UHF output signal:	UHF channels E31 to E39 (Variable)
Power requirements:	220V AC50 Hz
Power consumption:	33W
Weight:	9.6 kg
Dimensions:	420×122×390mm (W/H/D) (16.8×4.88×15.6 inches) (W/H/D)

Video

Input:	VIDEO LINE IN: Phono-type connector 1.0V (pp), 75 ohms unbalanced, sync. negative
Output:	VIDEO LINE OUT: Phono-type connector 1.0V (pp), 75-ohms, unbalanced, sync. negative
Signal-to-noise ratio:	Better than 42 dB

Audio

Input:	AUDIO LINE IN: Phono-type, 50 k-ohms, −10 dB
Output:	AUDIO LINE OUT: Phono-type, less than 10 k ohms, −5 dB, unbalanced
Frequency response:	50 to 8,000 Hz
Signal to noise ratio:	Better than 40 dB

Tape transport

Tape speed:	18.73 mm/sec.
Maximum recording time:	3 hours 15 min. (with L-750)
Fast forward time	Within 4.5 min. (L-500)
Rewind time	Within 4.5 min. (L-500)

Timer

LED digital display
Count down from AC-line frequency.

Design and specifications are subject to change without notice.

Caution: Copyright Act 1956 Users of video recording equipment should note that it may be unlawful to record television broadcasts, chinematograph films or video recording without the permission of the relevant copyright owner.

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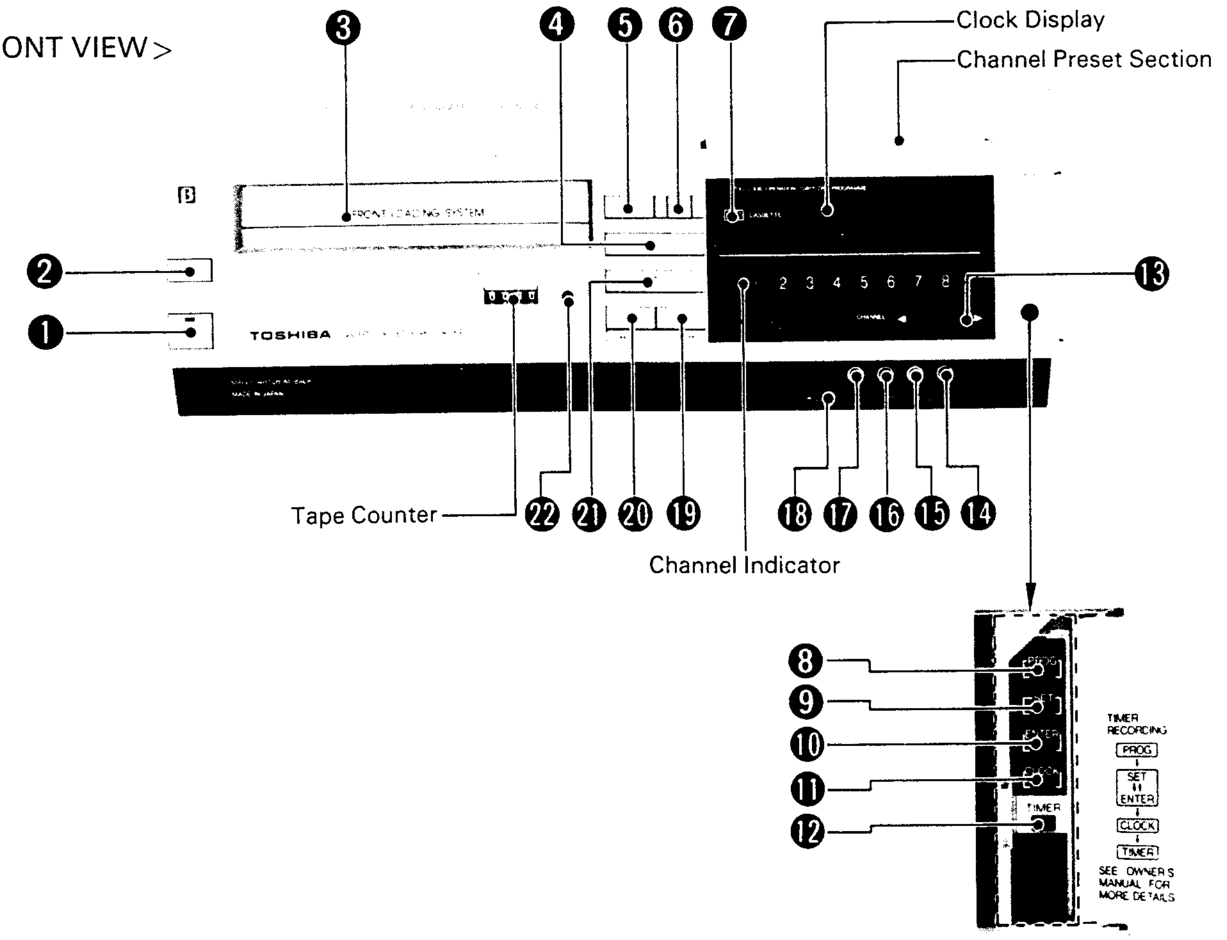
SECTION 1. GENERAL
IDENTIFICATION AND OPERATION OF CONTROLS

<FRONT VIEW>


❸
❹
❺
❻
❼
Clock Display
Channel Preset Section
FRONT LOADING SYSTEM
❷
❶
TOSHIBA
2 3 4 5 6 7 8
CHANNEL
⓭
Tape Counter
㉒
㉑
⑳
⓳
⓲
⓱
⓰
⓯
⓮
Channel Indicator
❽
❾
❿
⓫
⓬
PROG
SET
ENTER
CLOCK
TIMER
TIMER RECORDING
PROG
SET
ENTER
CLOCK
TIMER
SEE OWNER'S MANUAL FOR MORE DETAILS

❶ **"FUNCTION" switch.**
Turns VTR power on, and off for stand-by mode. With this switch in the ON mode, the recorder is ready for use and the lamp lights.
The STAND BY mode is used to switch off all functions of the recorder, except for the clock and the interface circuit between the recorder and your television receiver.

❷ **"EJECT" button**
Used to remove the cassette from the cassette compartment.

❸ **Cassette Compartment**
When the cassette is inserted in this compartment, the cassette will automatically be loaded ready for operation. The cassette indicator lamp lights.

❹ **"STOP" button**
Used to stop the tape under all conditions.

❺ **"PAUSE/STILL" button**
Used to stop a tape temporarily in the recording mode or used to watch a still picture in the playback mode. (This button is released automatically after 7 minutes. And the recorder returns to recording from pause or returns to playback from still.)

❻ **"REC" button**
Push this button to record. If the safety tab has been removed from the cassette, it will not be possible to record, thereby preventing your recordings being accidentally erased.

❼ **"CASSETTE" Indicator Lamp**
When the cassette is correctly set in the VTR ready for operation, this cassette indicator lamp will light. In the Timer mode, this Cassette Indicator lamp turns OFF, if a cassette is set in the VTR.

⑧ **"PROG" button**
Used to set the programme.

⑨ **"SET" button**
Used to set the clock and timer display section of the readout which is flashing.

⑩ **"ENTER" button**
Fixes and stores the information fed by the SET button.

⑪ **"CLOCK" button**
Used to set to the current time.

⑫ **"TIMER" button**
Push for timed recording after programming VTR for unattended recording.

⑬ **Channel Select Buttons**
Used to select the channels you wish to view or record.

⑭ **"VIDEO OUT" Terminal**
Provides a video signal from the recorder for use by other equipment.

⑮ **"VIDEO IN" Terminal**
Used for connecting a video input from other video equipment. Connecting a plug into this jack cuts off the picture from the tuner and records the video signal connected into the "VIDEO IN" jack.
Disconnecting the plug automatically resumes the picture from the tuner.

⑯ **"AUDIO OUT" Terminal**
Provides an audio signal from the recorder for use by other equipment.

⑰ **"AUDIO IN" Terminal**
Used for connecting an audio input from other equipment. Connecting a plug into this jack cuts off the audio signal coming from the tuner and records the audio signal connected to this "AUDIO IN" jack. Disconnecting the plug automatically resumes the audio signal from the tuner.

⑱ **"TRACKING" Control**
Used when playing cassettes recorded on other machines using the Beta system. Adjust this control to minimize black streaks across the TV picture during playback. Set the control in its center position when recording and during subsequent playback of cassettes recorded on this VTR.

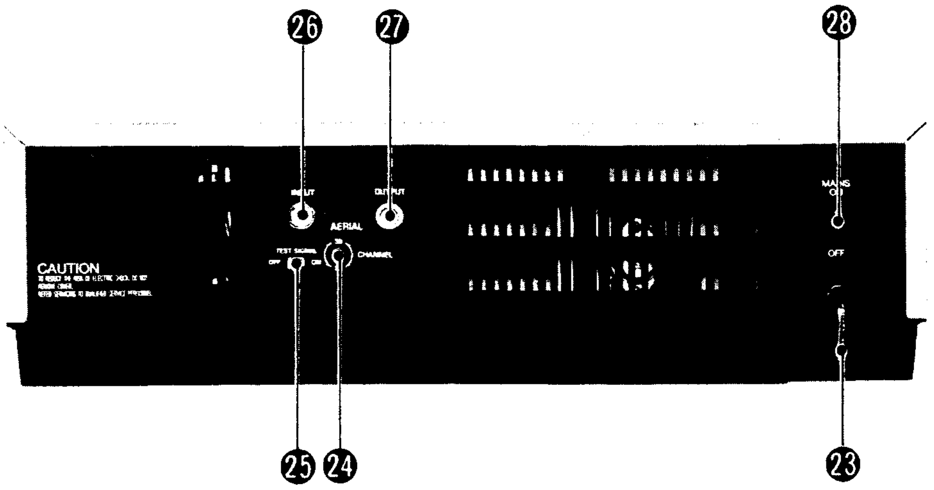
⑲ **"FF/CUE" button**
The FF/CUE button serves a dual purpose. Push for fast forward of the tape. When this button is pushed during the playback mode, the picture moves quickly forward (about 8 times the normal speed) and you can search for the desired part of the programme.

⑳ **"REW/REVIEW" button**
The REW/REVIEW button serves a dual purpose. Push for rewinding of the tape. When this button is pushed during the playback mode, the picture moves quickly backward (about 8 times the normal speed) and you can search for the desired part of the programme.

㉑ **"PLAY" button**
Push for playback of a recorded tape.

㉒ **Counter Reset Button**
Used to set the tape counter to the "0000" position.

REAR VIEW



㉓ Power Cord
Connect this cord into the AC outlet (AC 220V).

㉔ "VTR UHF OUTPUT"
The output from the recorder to your television receiver can be adjusted to any channel from 31 to 39 by using a screwdriver adjustment, as described under "SET YOUR TELEVISION TO THE VTR CHANNEL".

㉕ "TEST SIGNAL" Switch
Provides a test signal to assist you to tune your receiver to the output of the video recorder , as described under "SET YOUR TELEVISION TO THE VTR CHANNEL".

㉖ "AERIAL IN" Terminal
Connect your television antenna to this terminal.

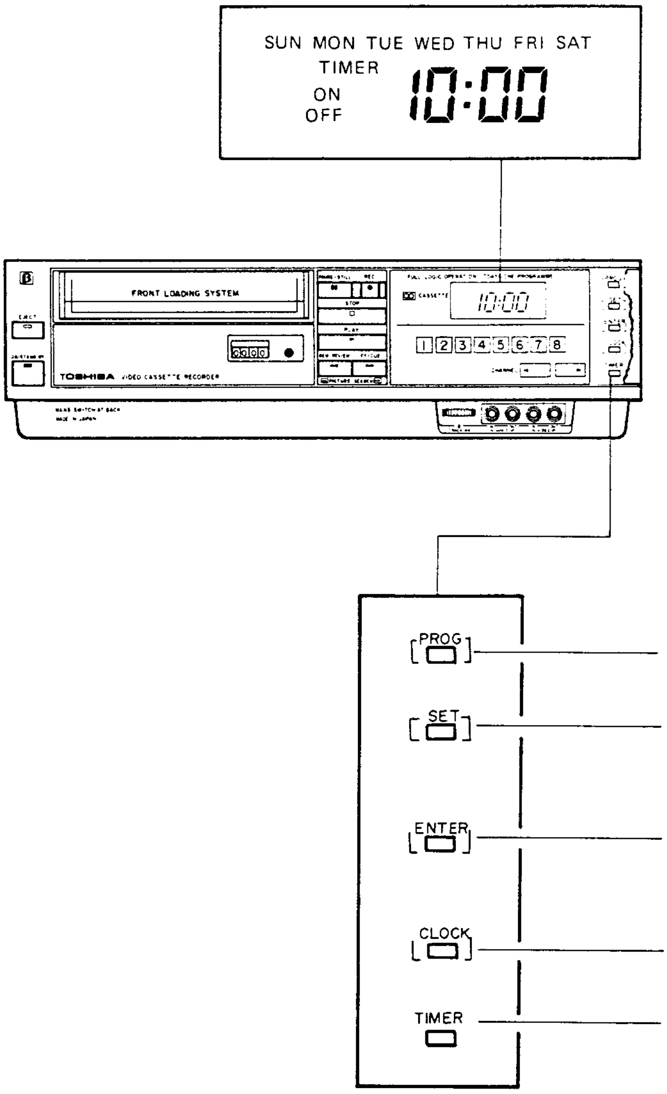
㉗ "AERIAL OUT" Terminal
Connect this terminal to your television receiver, using the cable provided.

㉘ "MAINS" Switch
This switch is located at the rear of the recorder. Switching this ON will supply power to the recorder and the clock.

TIMER

PROGRAMMABLE TIMER

- * This timer can reserve one recording time of one channel for a week or one programme at the same time for everyday.
- * If power to the VTR is interrupted, the clock will continue to run and the programming will not be disturbed for about 2 seconds.
  After 2 seconds of power interruption if the clock is flashing 0 : 00. The clock and programming will have to be reset.
- * The clock used is of the 24-hour type.

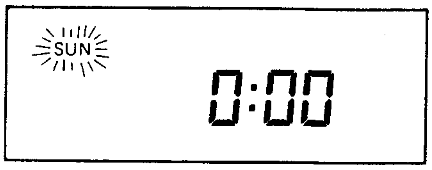

SUN MON TUE WED THU FRI SAT
TIMER
ON
OFF
10:00
FRONT LOADING SYSTEM
TOSHIBA VIDEO CASSETTE RECORDER
10:00
1 2 3 4 5 6 7 8
PROG
SET
ENTER
CLOCK
TIMER

PROG	Used to set the programme.
SET	Used to set the clock and timer display section of the readout which is flashing.
ENTER	Fixes and stores the information fed by the SET button.
CLOCK	Used to set to the current time.
TIMER	Push for timed recording after programming VTR for unattended recording.

< Setting the Current Time >

Example ; Monday 9 : 00

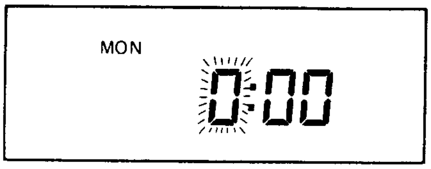
a) FUNCTION switch may be ON or in STAND BY.



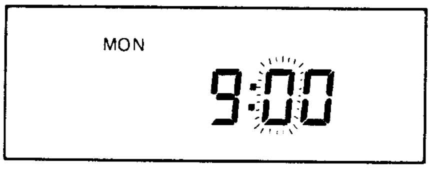
b) Push the CLOCK button.

c) A day of the week will flash.

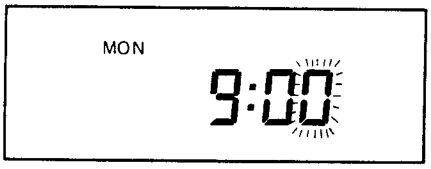
d) The Day will be changed each time the SET button is pushed. (If the button is held down, the Day will change rapidly.)



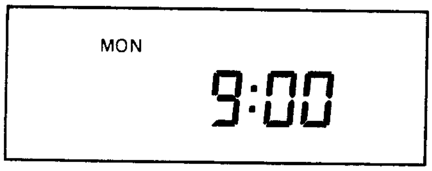
e) When MON (current day) is displayed, release SET button and push ENTER button. The hour portion will now flash.



f) Push the SET button until the hour portion reads 9 (current hour). Release the SET button and push the ENTER button. The 10 minute portion will now flash.

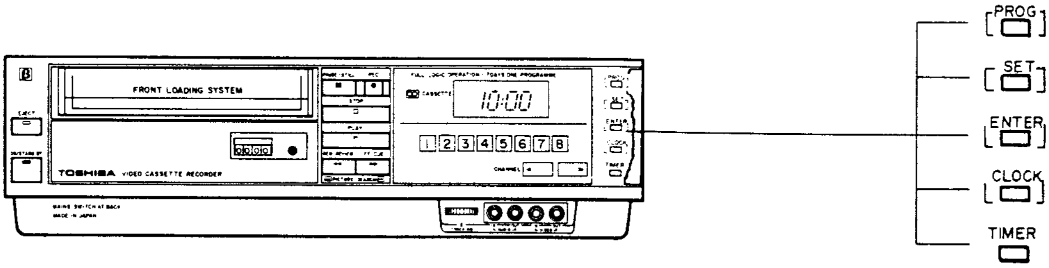


g) Push the SET button until the 10 minute portion reads 0. Then push the ENTER button. The 0 minute portion will now flash.



h) Push the SET button until the 0 minute portion reads 0. Then push the ENTER button.

Time moves at the same time by pushing ENTER button.

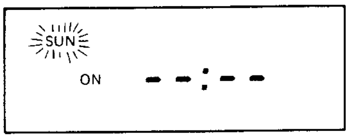

FRONT LOADING SYSTEM
TOSHIBA VIDEO CASSETTE RECORDER
10:00
1 2 3 4 5 6 7 8
PROG
SET
ENTER
CLOCK
TIMER

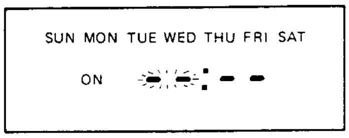
Note;

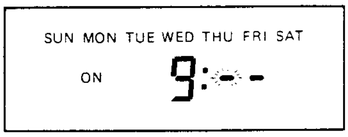
* Be sure to set the current time before "SETTING THE PROGRAMMABLE TIMER".

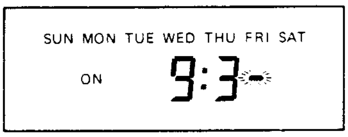
Example 1.
(Everyday 9:30 ~ 10:00
channel 2 position)

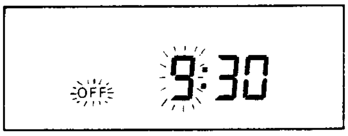
1. Set the FUNCTION switch "ON".
2. Push the PROG button.
   (Day portion is flashing.)
3. Set the ON time.
   Push SET button until day is everyday.
   (SUN, MON, ... SAT portions are flashing)
   .... Push ENTER.
4. Push SET button until hour reads 9.
   .... Push ENTER.
5. Push SET button until 10 min. reads 3.
   .... Push ENTER.
6. Push SET button until 0 min. reads 0.
   .... Push ENTER.
7. OFF will now be flashing.
   Set OFF time to 10 : 00 in the same manner as setting the ON time.
   (CH is flashing.)
8. Push SET button until the desired channel is reached.
   (See the channel indicator.)
   .... Push ENTER.
9. Push CLOCK button.
   (Timer display shows the current time.)
10. Push TIMER button.
11. Set the power switch of TV "OFF".

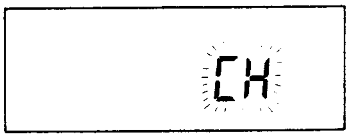
❷


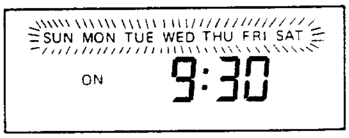
❸

SUN MON TUE WED THU FRI SAT
ON
--:--

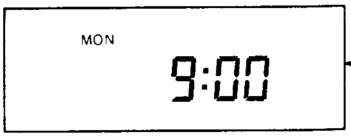
❹

SUN MON TUE WED THU FRI SAT
ON
9:--

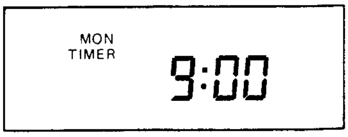
❺

SUN MON TUE WED THU FRI SAT
ON
9:3-

❻


❼


❽

SUN MON TUE WED THU FRI SAT
ON
9:30

❾


❿

MON
TIMER
9:00

"MON" "9 : 00" shows the current time.

Example 2.
(Tuesday 10:00 ~ 11:00
channel 4 position)

1. Set the FUNCTION switch "ON".
2. Push the PROG button.
   (Day portion is flashing.)
3. Set the ON time
   Push SET button until day is "TUE".
   .... Push ENTER.
4. Push SET button until hour reads 10.
   .... Push ENTER.
5. Push SET button until 10 min. reads 0.
   .... Push ENTER.
6. Push SET button until 0 min. reads 0.
   .... Push ENTER.
7. OFF will now be lit. Set OFF time to 11 : 00 in the same manner as setting the ON time.
   (CH is flashing.)
8. Push SET button until the desired channel is reached.
   (See the channel indicator.)
   .... Push ENTER.
9. Push CLOCK button.
10. Push TIMER button.
11. Set the power switch of TV "OFF".

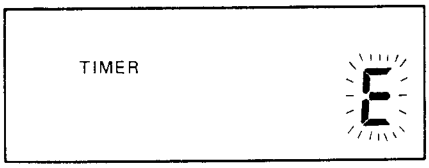
Notes:

1. VTR FUNCTION switch must be ON when programming the timer.
2. After programming is completed, push the TIMER switch.
3. It is not necessary to push the RECord button as this is automatic in the TIMER mode.
4. When you want to operate VTR after timed programming, set the FUNCTION switch of VTR to ON. After operating, be sure to push the TIMER button.

ERROR

When the ERROR lamp "E" is flashing, confirm the following items.

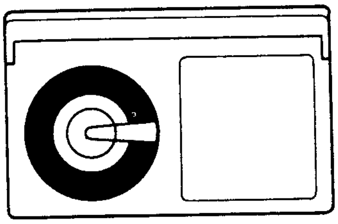
1. Is the ON time same as OFF time?
   Set the programmable timer again.
2. Is the cassette into the cassette compartment?
3. Is the tab of cassette removed?



β VIDEO CASSETTE

Unlike an audio cassette, this video cassette cannot be reversed, since the full width of the tape is used for recording of picture and sound. Be sure to start operation of your VTR with the cassette in position as shown on the above side portion of Figure 1. The tape in your video cassette cannot be spliced.

To protect your recording from accidental erasure, break off the tab on the reverse side of the video cassette (Figure 2).
With the tab removed, you cannot record on the cassette inserted. When you want to rerecord simply cover the hole with a piece of cellophane or vinyl tape.



This side up
for recording

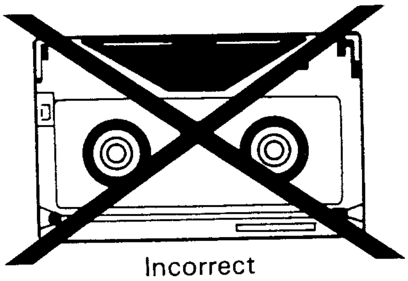
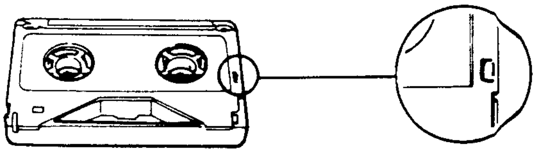


Fig. 1



Cellophane or Vinyl tape

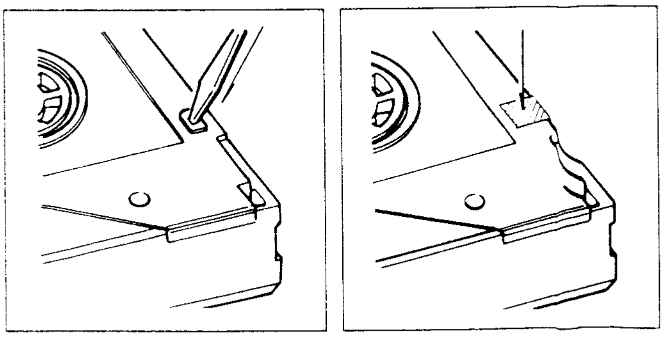


Fig. 2

SECTION 2. ELECTRICAL ADJUSTMENTS

2-1. ALIGNMENT AND ELECTRICAL ADJUSTMENT

For these adjustments, use the equipment mentioned below and proceed by using the alignment tape and video signal.

Instruments and Tools Required

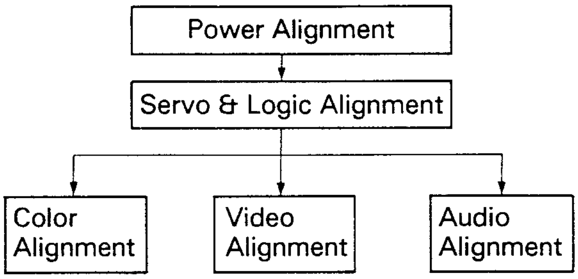
1. Colour TV receiver
2. Oscilloscope having 10 MHz or more bandwidth
3. Colour-bar generator
4. Frequency counter
5. VTVM
6. VOM (20 kΩ/V)
7. Audio oscillator
8. Audio attenuator
9. KR5-2H alignment tape (Part No. 70955083)
10. Alignment jigs and tools, 1 set

Signal Level and Input and Output Impedance Requirement

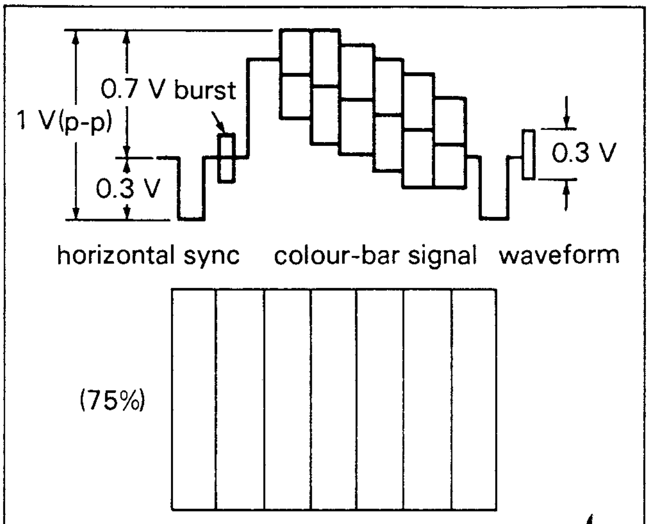
1. Video input: Negative sync. 1 Vp-p standard composite video signal. 75 Ω.
2. Video output: Same as above.
3. Audio input: unbalanced LINE −10 dB 50 kΩ
4. Audio output: −5 dB, 10 kΩ or less.

Adjustment Sequence

The VTR should be adjusted in the sequence shown below.


Power Alignment
Servo & Logic Alignment
Color Alignment
Video Alignment
Audio Alignment

The suitable output waveform of the colour-bar signal generator is shown below.


0.7 V burst
1 V(p-p)
0.3 V
0.3 V
horizontal sync
colour-bar signal
waveform
(75%)

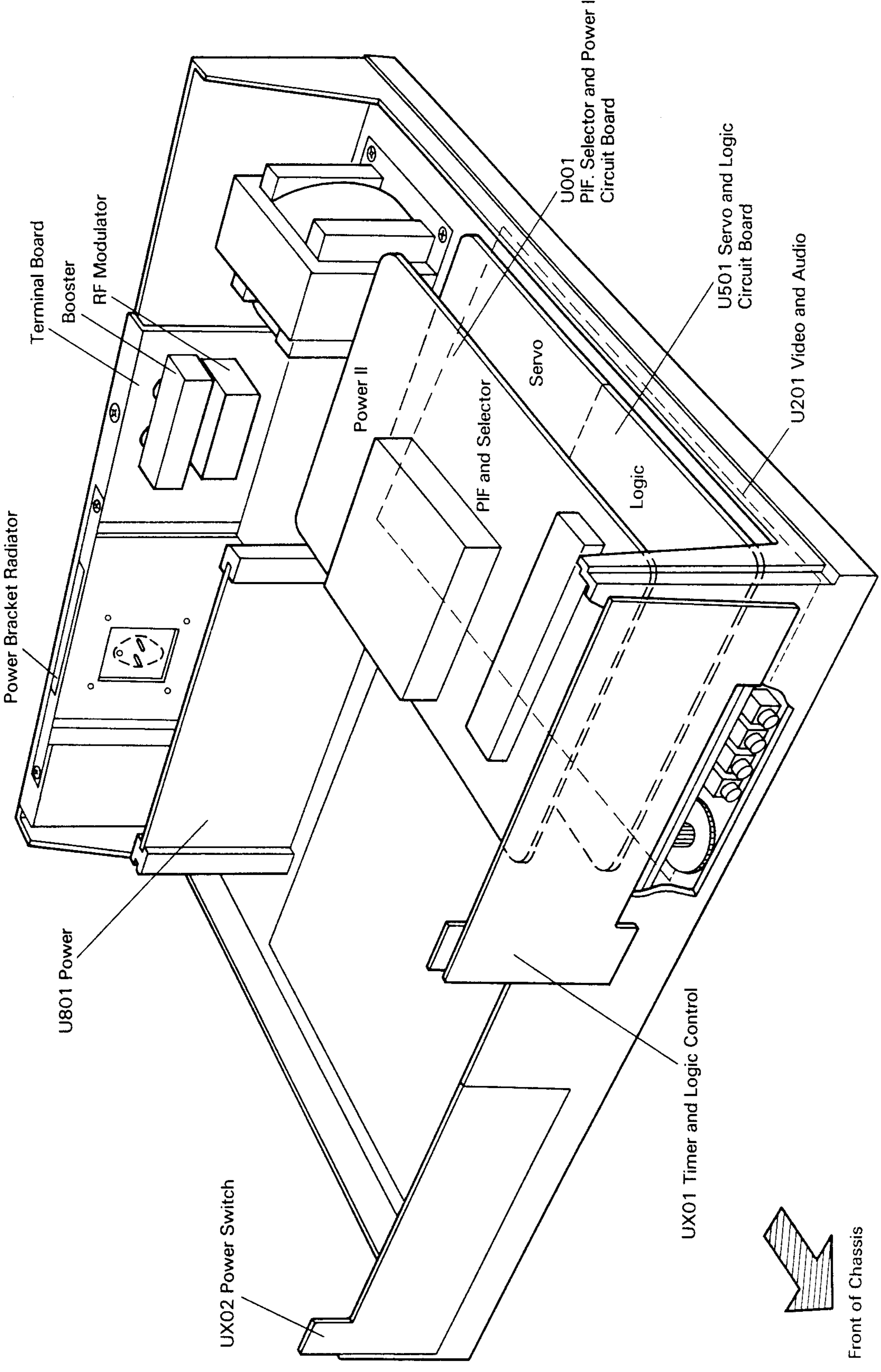
Colour bar pattern

75% Colour Bar Signal Recorded On the Alignment Tape

The KR5-2H alignment tape contains the following prerecordings.

Mode	Video signal	Audio signal	Playing time
1 CCIR (PAL)	Colour-bar (75%)	3 kHz (−5 dB)	20 min
2 CCIR (PAL)	Monoscope	333 Hz (−25 dB)	
3 CCIR (PAL)	Sweep (RF)	5 kHz (−25 dB)	
4 CCIR (PAL)	Tracking	1 kHz (−5 dB)	

2-2 PW BOARD LOCATION

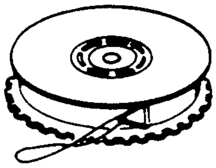

Terminal Board
Booster
RF Modulator
Power Bracket Radiator
U801 Power
UX02 Power Switch
U001
PIF. Selector and Power II
Circuit Board
U501 Servo and Logic
Circuit Board
U201 Video and Audio
UX01 Timer and Logic Control
Front of Chassis
Power II
PIF and Selector
Servo
Logic

2-3 TOOL AND JIGS REQUIRED

NAME	CODE NO.	JIG NO.	Q'TY	SKETCH NO.	REMARK
Forward Back-Tension Measurement Jig Fixture	70909025	SL-0002	1	1	○
T Type Torque Measurement Cassette	70909031	SL-0003	1	2	×
R-F Type Torque Measurement Cassette	70909030	SL-0004	1	2	×
Forward Tension Alignment Jig	70909005		1	3	○
Back-Tension Bracket	70909075		1	4	○
Loading Ring Clearance Gauge	70908018	SL-0007	1	5	○
Cassette Reference Plate	70909019	SL-0008	1	6	○
Tape Guide Adjustment Jig	70909036		1	7	○
Rotating Head Disk Alignment Jig Fixture (Eccentricity Gauge)	70909021	SL-0012	1	8	○
Reel Table Retainer Removal Jig	70909065		1	12	○
Capstan FG Adjustment Jig (B)	70909081		1	9	○
Tension Gauge (Max. 100g)	70909024		1	10	○
Tension Gauge (Max. 200g)	70909012		1	10	×
Tension Gauge (Max. 500g)	70909029		1	10	○
Dental Mirror	70954003		1	11	○
Alignment Tape (KR5-1Z)	70955083		1		○
Capstan FG Adjustment Jig (A)	70909066		1	13	○

NOTE: ○ . . . Indispensable tool × . . . Not indispensable tool

①



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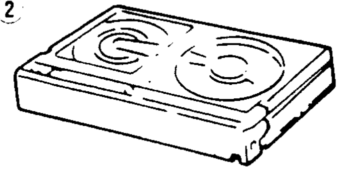

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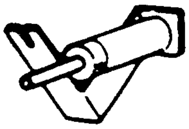

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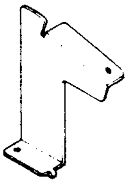

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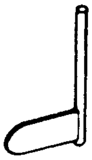

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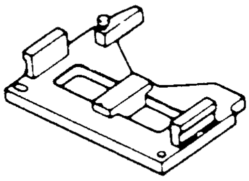

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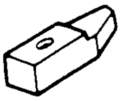

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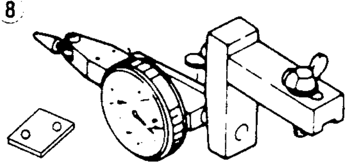

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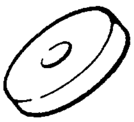

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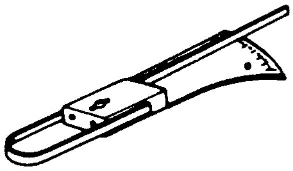

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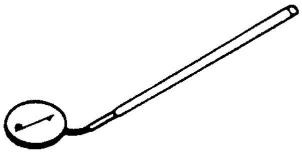

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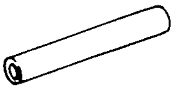

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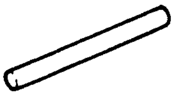
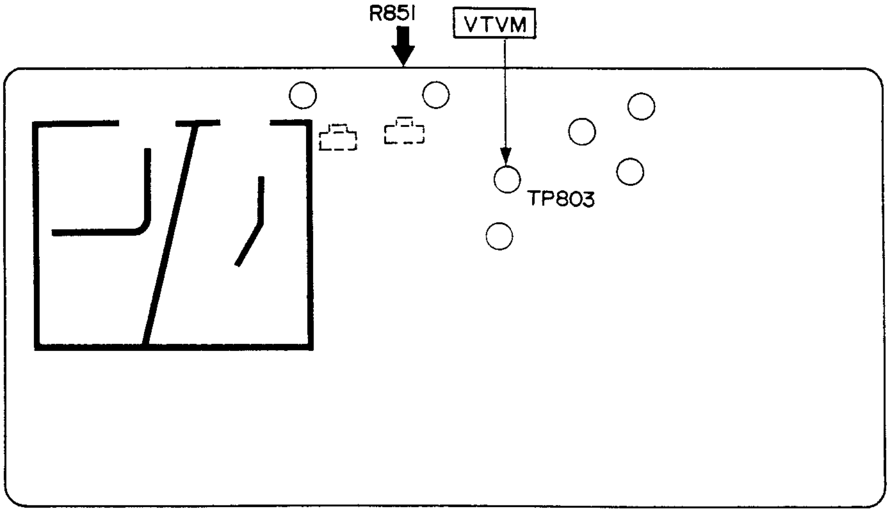


2-4 ELECTRICAL ADJUSTMENT

POWER SUPPLY CIRCUIT ADJUSTMENT METHOD
1. 12 V

Adjustment Location	Measuring Point	Measuring Equipment	Conditions of Adjustment
R851	TP803	VTVM	

(1) Turn power on.
(2) Adjust R851 until the VTVM reads 12±0.15 V.
If R951 is turned too far counterclockwise (the voltage is less than 12 V), the VTR may not work.

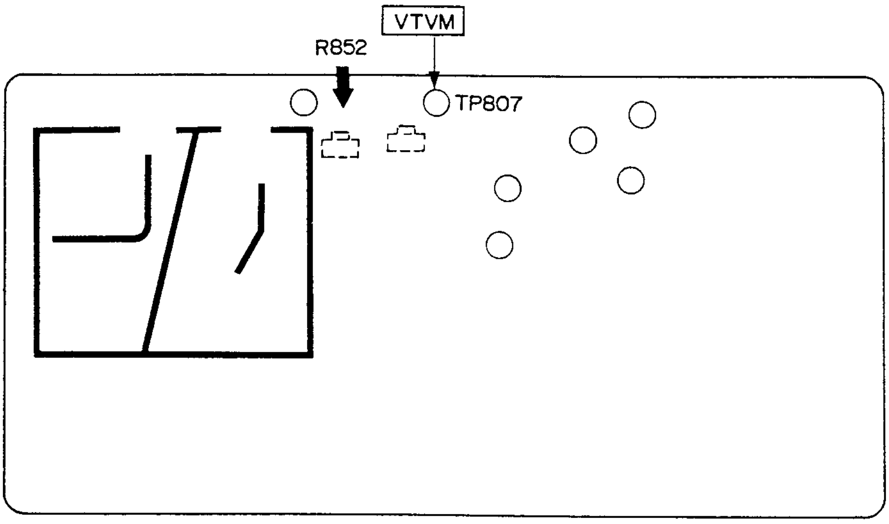


POWER CIRCUIT BOARD (Pattern Side View)

2. 6.5 V

Adjustment Location	Measuring Point	Measuring Equipment	Conditions of Adjustment
R852	TP807	VTVM	

(1) Turn power on.
(2) Adjust R852 until the VTVM reads 6.5 V±0.2 V.
If R852 is turned too far counterclockwise (the voltage is less than 6.5 V), the VTR may not work.



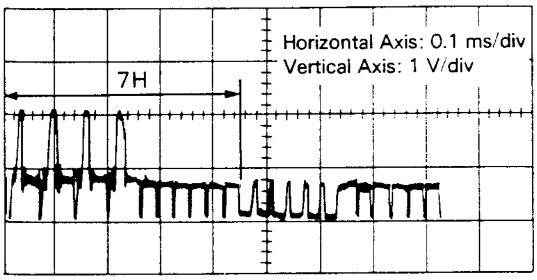
POWER CIRCUIT BOARD (Pattern Side View)

SERVO AND LOGIC CIRCUIT ADJUSTMENT METHOD

1. PLAYBACK PHASE

Adjustment Location	Measuring Point	Measuring Equipment	Conditions of Adjustment
R551 (PG1) R552 (PG2)	TP203 (TP501)	Oscilloscope	PLAY mode

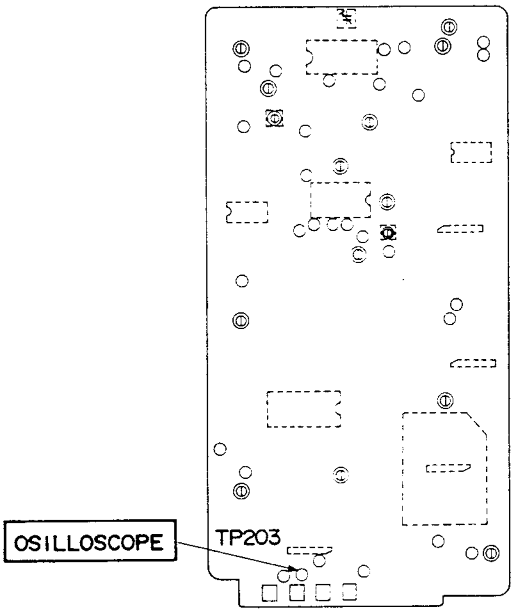
If the front edge of the vertical synchronising signal is more than 7 H, switching noise is present at the bottom of the TV screen.
If the front edge of the vertical synchronising signal is less than 7 H, the vertical sync, will be lost.



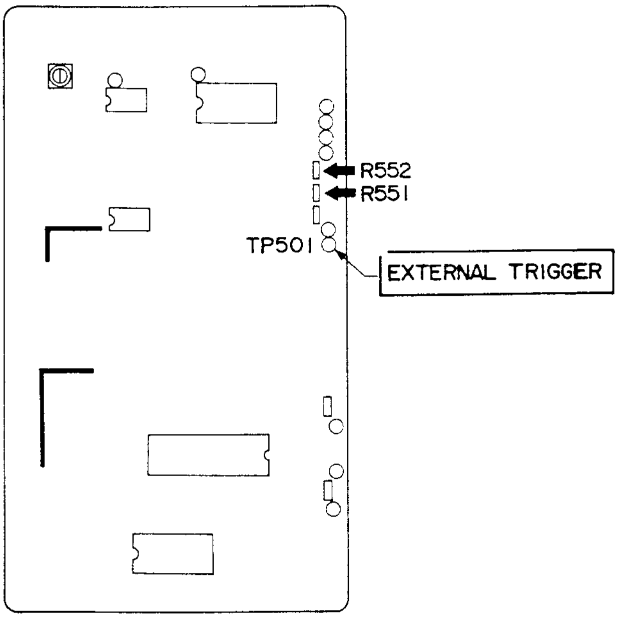
(1) Playback an alignment tape, and observe the video signal at the video output terminal. (Use the oscilloscope in the "external triggering" mode and supply the RF switching pulse TP501 to the "external triggering" terminal.)

(2) Adjust R552 so that the phase difference between the front edge of the RF switching pulse and the front edge of the vertical synchronising signal is 7 H (±2 H)-(triggering slope "−").

(3) Adjust R551 so that the phase difference between the front edge of the RF switching pulse and the front edge of vertical synchronising signal is 7 H (±2 H)-(triggering slope "+").



VIDEO & AUDIO CIRCUIT BOARD
(Pattern Side View)



SERVO & LOGIC CIRCUIT BOARD
(Part Side View)

2. TRACKING CENTER VR

Adjustment Location	Measuring Point	Measuring Equipment	Conditions of Adjustment
R553	TP513 (TP501)	Oscilloscope	REC/PLAY mode

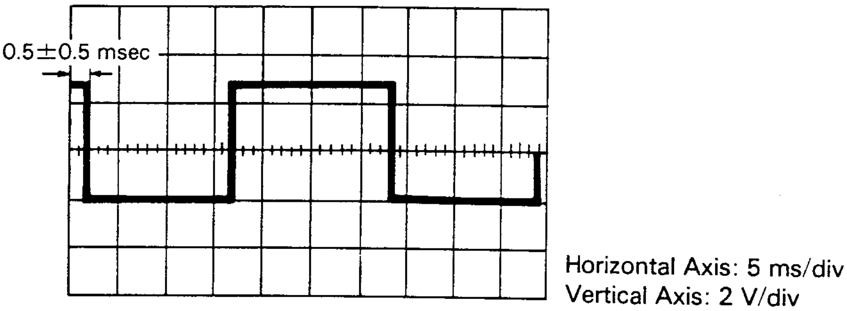
If the leading edge of waveform slips to left, picture quality may become poor. If the leading edge of waveform slips to right, crosstalk noise may appear when playing back.

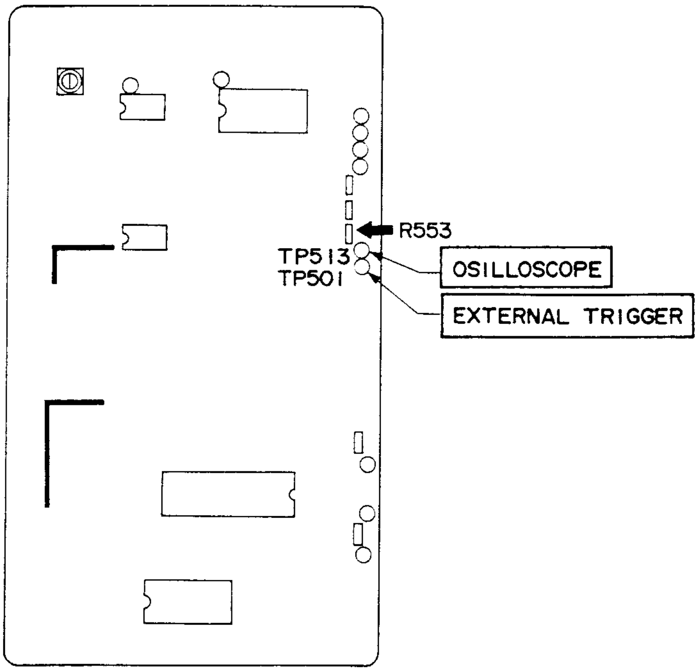
(1) Turn the tracking control to center click position.

(2) Record a composite video signal and play it back.

(3) Connect the probe of the oscilloscope to TP513 and its external trigger terminal to TP501. (Trigger Slope "−").

(4) Adjust R553 until the oscilloscope shows that the leading edge is extreme left side of its screen as shown in figure below.





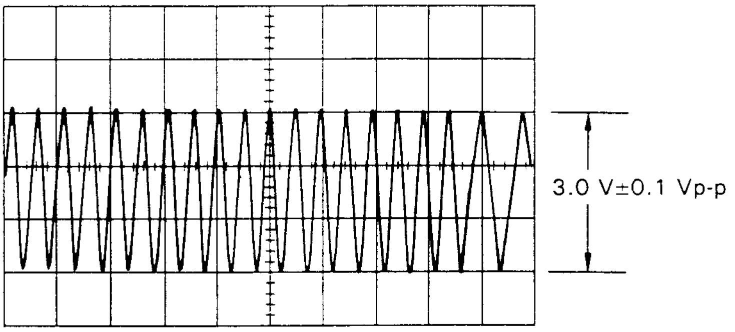
SERVO & LOGIC CIRCUIT BOARD (Part Side View)

3. REW SENSOR OSC

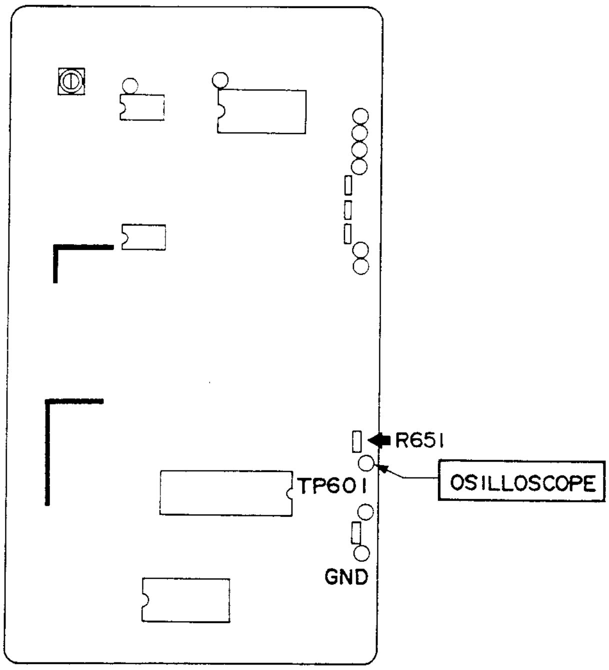
Adjustment Location	Measuring Point	Measuring Equipment	Conditions of Adjustment
R651	TP601	Oscilloscope	REW mode

If the waveform is small, the VTR will not run in the reverse mode (Rewind).
If the waveform is too large, the VTR will not automatically shut off at the end of the tape.

(1) Set up the VTR in the rewinding mode.
(2) Connect the probe of the oscilloscope to TP601.
(3) Turn R651 fully clockwise.
(4) Then adjust R651 by gradually turning counterclockwise until the amplitude of the waveform shown on the oscilloscope is 3.0±0.1 Vp-p.



Horizontal Axis: 10 µs/div
Vertical Axis: 1 V/div



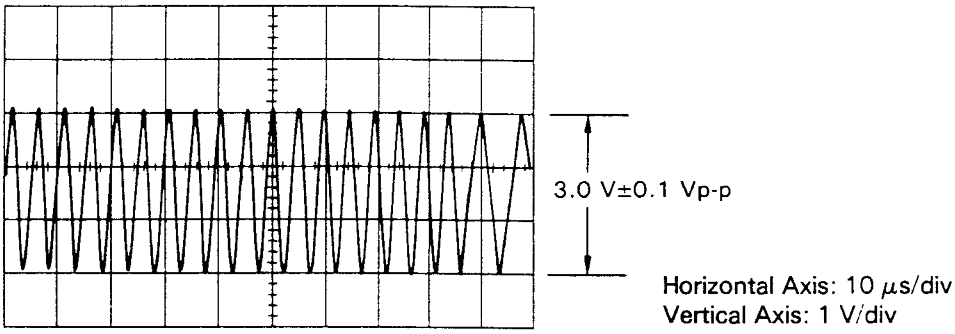
SERVO & LOGIC CIRCUIT BOARD (Part Side View)

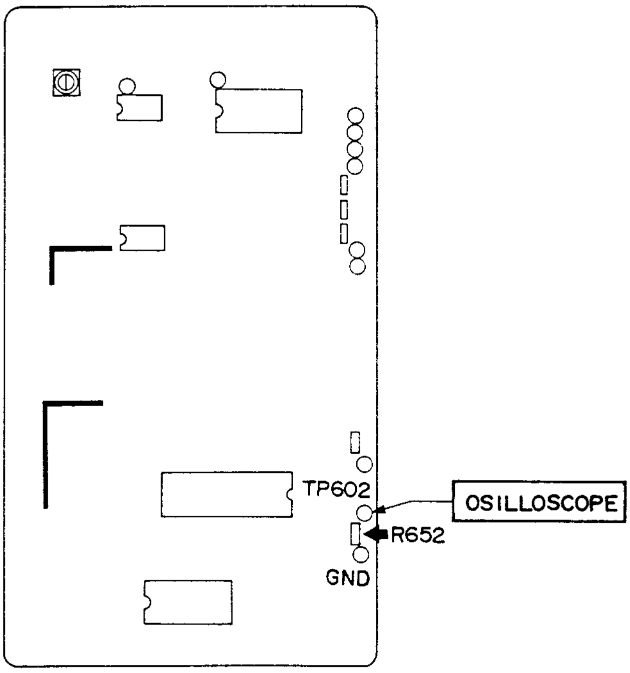
4. FAST-FORWARD SENSOR OSC

Adjustment Location	Measuring Point	Measuring Equipment	Conditions of Adjustment
R652	TP602	Oscilloscope	PLAY mode

If the waveform is too small, the VTR will not run in the forward mode.
If the waveform is too large, the VTR will not automatically shut off at the end of the tape.

(1) Set up the VTR either in the playback, recording, or fast-forward mode.
(2) Connect the probe of the oscilloscope to TP602.
(3) Turn R652 fully clockwise.
(4) Adjust R652 by gradually turning counterclockwise until the amplitude of the waveform shown on the oscilloscope is 3.0±0.1 Vp-p.





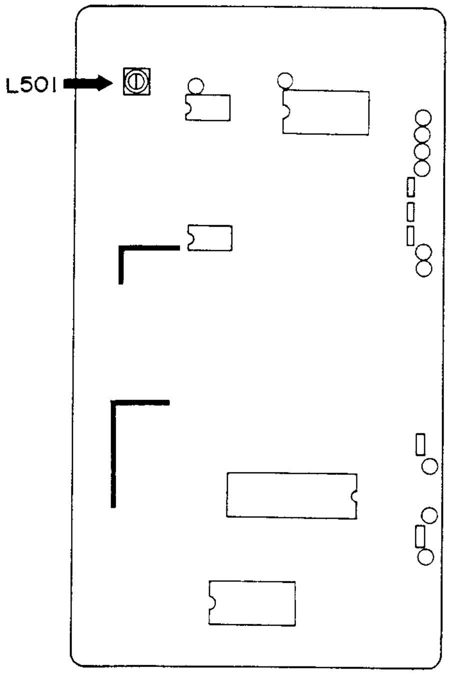
SERVO & LOGIC CIRCUIT BOARD (Part Side View)

5. SEARCH

Adjustment Location	Measuring Point	Measuring Equipment	Conditions of Adjustment
L501 (fH)	Horizontal frequency of monitor TV	TV Picture	REVIEW mode

If the frequency is too high (or low) during CUE and REVIEW mode, the horizontal sync. may be lost.

(1) Play back a pre-recorded tape.
(2) When proceeding with REVIEW, adjust L501 so that horizontal sync. of TV picture is stable.
(3) Make certain that horizontal sync. is undisturbed during CUE and REVIEW.
(4) Make adjustment so that Y signal and C signal do not deviate from colour bar signal.



SERVO & LOGIC CIRCUIT BOARD (Part Side View)

VIDEO CIRCUIT ADJUSTMENT METHOD
LUMINANCE CIRCUIT ADJUSTMENT (Recording mode)
1. SYNC TIP FREQUENCY

Adjustment Location	Measuring Point	Measuring Equipment	Conditions of Adjustment
R251	TP202	Frequency Counter	REC mode

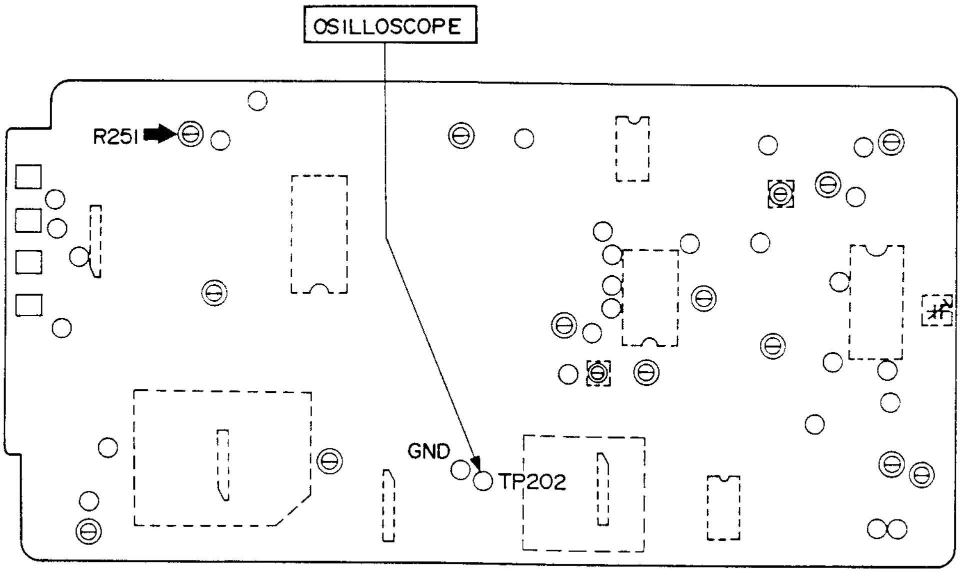
If the frequency is too high, picture of TV is over modulated.
If the frequency is too low, picture quality may become poor.

(1) Open the VIDEO LINE IN connector.
(Insert plug with nothing connected to it.)

(2) Set the VTR in the recording mode.

(3) Connect the frequency counter to TP202.

(4) Adjust R251 (FM-CARRIER) until the frequency counter reads 3.8 MHz ±0.05 MHz.



VIDEO & AUDIO CIRCUIT BOARD (Pattern Side View)

2. FM DEVIATION

Adjustment Location	Measuring Point	Measuring Equipment	Conditions of Adjustment
R252 (DEVIATION)	TP206 (TP204)	Oscilloscope	EE mode

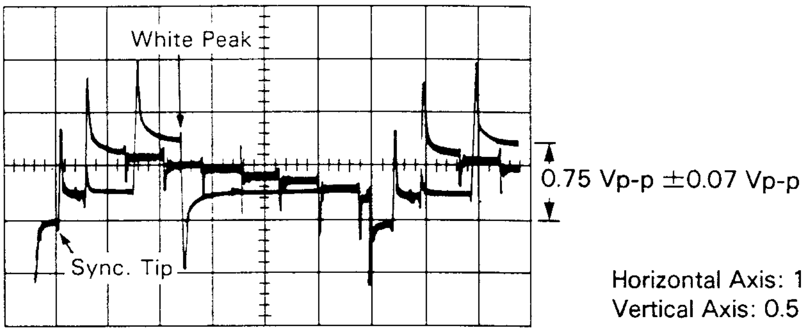
If the waveform is too large, picture of TV is over modulated.

(1) Supply the colour bar signal to the VIDEO LINE IN connector.

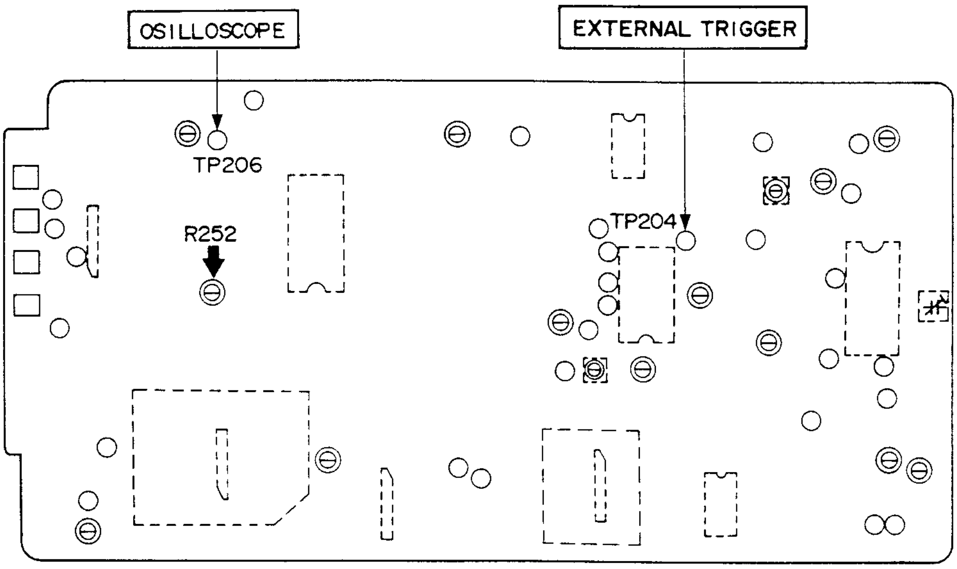
(2) Connect the oscilloscope to TP206.

(3) Set up the oscilloscope so that it is triggered by the HD pulse (TP204) and shows the colour-bar signal of approximately 2 H cycles.

(4) Adjust R252 (DEVIATION) until the amplitude measured from the sync tip to white peak is 0.75 Vp-p ±0.07 Vp-p.
Do not include overshoot and undershoot protions of the waveform.



Horizontal Axis: 10 μs/div
Vertical Axis: 0.5 V/div



VIDEO & AUDIO CIRCUIT BOARD (Pattern Side View)

LUMINANCE CIRCUIT ADJUSTMENT METHOD (Playback mode)

1. PLAYBACK Y SINGAL OUTPUT LEVEL

Adjustment Location	Measuring Point	Measuring Equipment	Conditions of Adjustment
R253	TP203 (TP204)	Oscilloscope	PLAY back mode

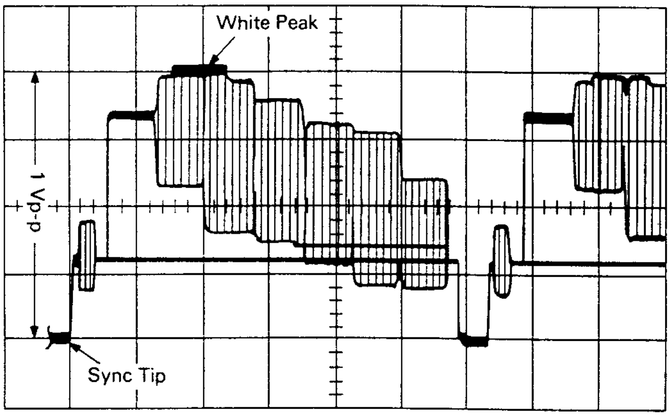
If the amplitude is more than 2.0 V, contrast of picture may be too strong. If the amplitude is less than 2.0 V, contrast of picture may be weak.

(1) Playback the colour bar signal of the alignment tape.

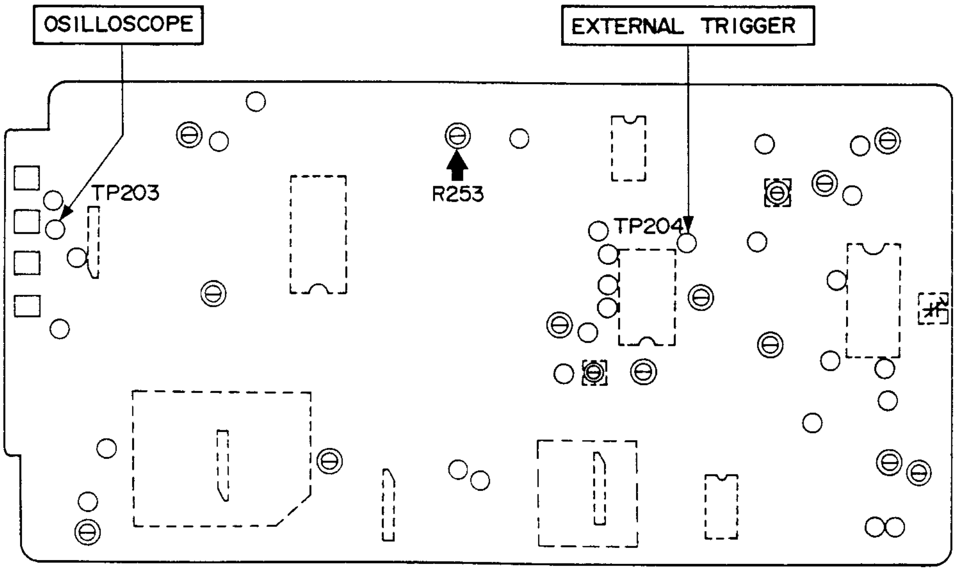
(2) Connect the oscilloscope to TP203.

(3) Set up the oscilloscope so that it is triggered by the HD pulse (TP204) and shows the colour-bar signal of approximately 2 H cycles.

(4) Adjust R253 (PB LEVEL) until the playback Y signal output level, or the 100% white peak level from the sync tip, is 1.0 Vp-p ±0.1 Vp-p.



Horizontal Axis: 10 μs/div
Vertical Axis: 0.25 V/div



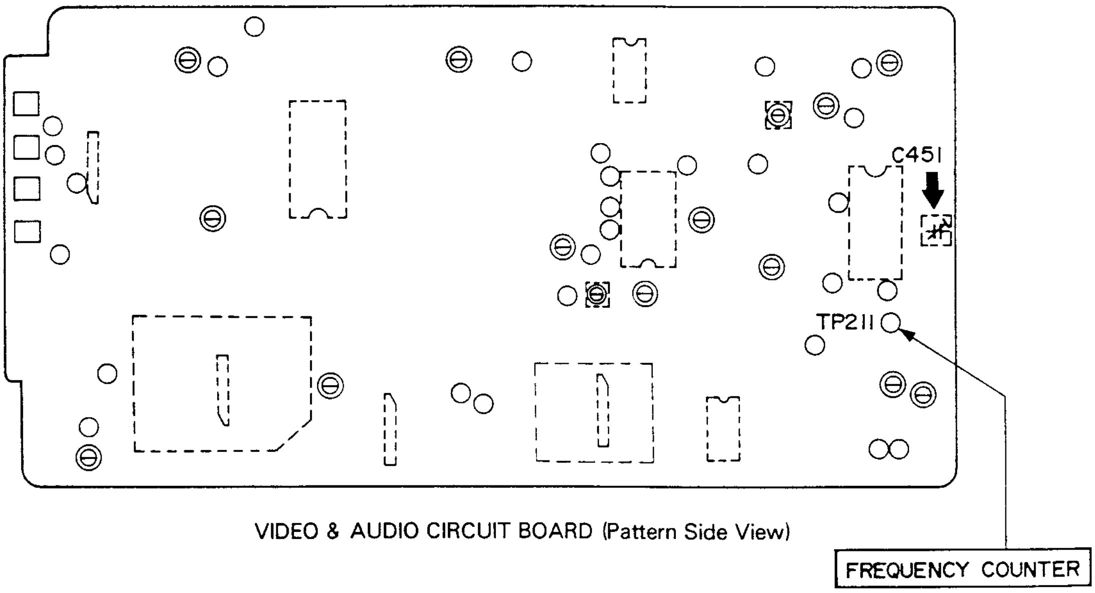
VIDEO & AUDIO CIRCUIT BOARD (Pattern Side View)

2. 4.43 MHz ×0

Adjustment Location	Measuring Point	Measuring Equipment	Conditions of Adjustment
C451	TP211	Frequency Counter	PLAY back mode

(1) Playback the colour bar section of the alignment tape.

(2) Connect the frequency counter tp TP211 and adjust the core of C451 to maintain 4,433619 MHz ±20 Hz of a frequency counter reading.



VIDEO & AUDIO CIRCUIT BOARD (Pattern Side View)

3. COMB FILTER

Adjustment Location	Measuring Point	Measuring Equipment	Conditions of Adjustment
R457 L451	TP220 (TP204)	Oscilloscope	REC/EE mode

If the colour signal is too large, horizontal color bar and colour flicker may appear.

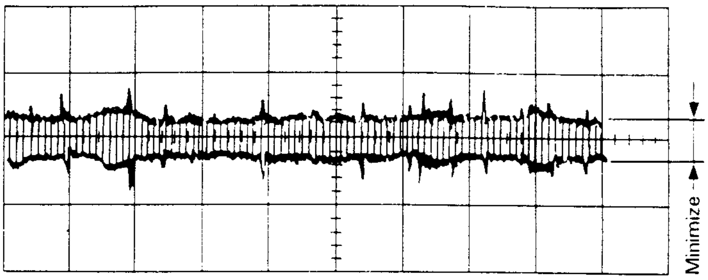
(1) Supply the staircase colour bar signal to the VIDEO LINE IN connector.

(2) Connect the oscilloscope to TP220.

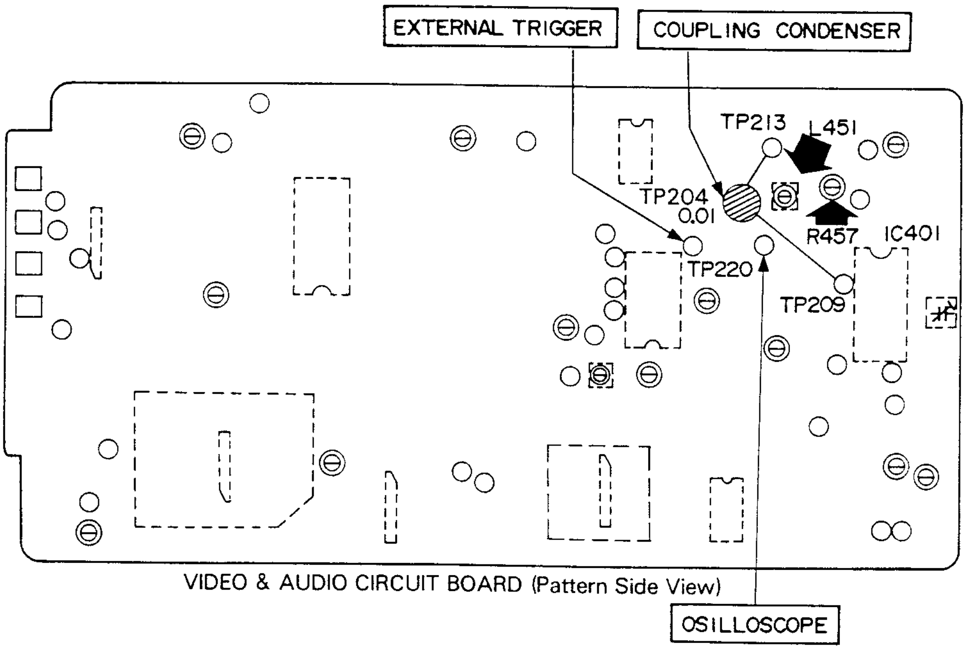
(3) Set up the oscilloscope so that it is triggered by the HD pulse (TP204) and shows the colour-bar signal of approximately 2 H cycles.

(4) Connect the IC401#35 pin (TP209) to TP213 with a capacitor.

(5) Adjust R457 (COMB, 2 H) until the colour signals are as small as possible.
Also, adjust the core of L451 until the colour signal is minimized.



Horizontal Axis: 10 μs div
Vertical Axis: 0.05 V div


EXTERNAL TRIGGER
COUPLING CONDENSER
TP213
L451
TP204
0.01
R457
IC401
TP220
TP209
OSILLOSCOPE

VIDEO & AUDIO CIRCUIT BOARD (Pattern Side View)

4. 5.12 MHz CARRIER BALANCE

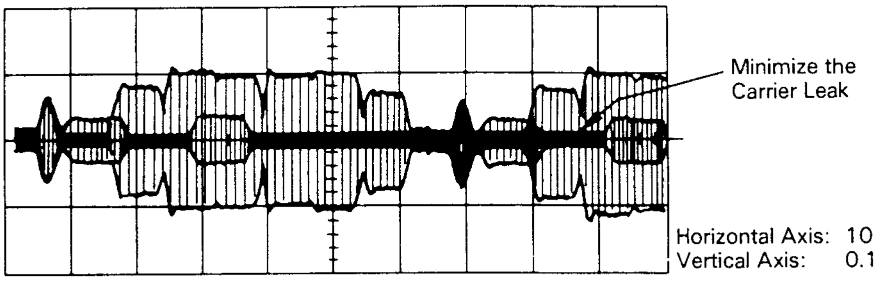
Adjustment Location	Measuring Point	Measuring Equipment	Conditions of Adjustment
R451	TP210 (TP204)	Oscilloscope	REC/EE mode

(1) Supply the colour bar signal to the VIDEO LINE IN connector.

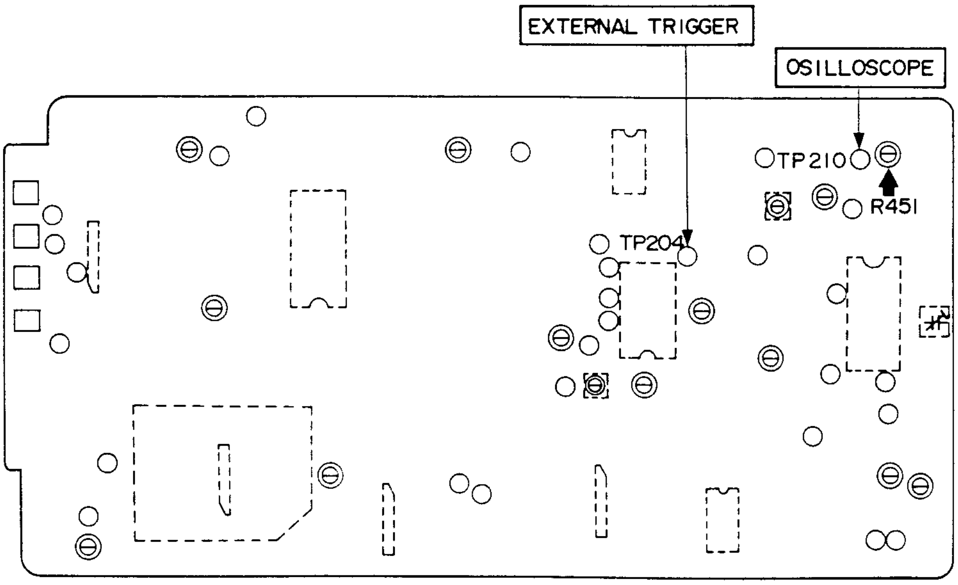
(2) Connect the oscilloscope to TP210.

(3) Set up the oscilloscope so that it is triggered by the HD pulse TP204 show the colour bar signal of approximately 2 H cycles.

(4) Adjust R451 (CARRIER BALANCE) to maintain the minimum carrier leak of 5.12 MHz as show below.



Horizontal Axis: 10 μs/div
Vertical Axis: 0.1 V/div

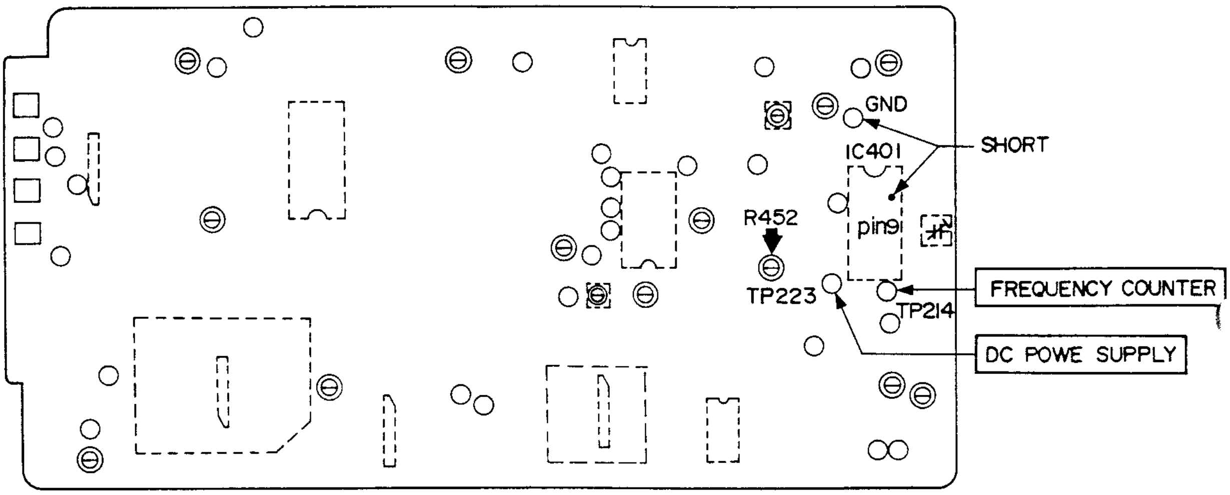


VIDEO & AUDIO CIRCUIT BOARD (Pattern Side View)

5. 5.5 MHz VCO

Adjustment Location	Measuring Point	Measuring Equipment	Conditions of Adjustment
R452	TP214	Frequency Counter	REC/EE mode

(1) Set up the VTR in the REC/EE mode.
(2) Connect the IC401#9 pin to GND.
(3) Connect the DC power supply to TP223 and supply +4.5 V.
(4) Connect the frequency counter to TP214.
(5) Adjust R452 (VCO) until the frequency counter reads 5.484 MHz ±7 kHz.

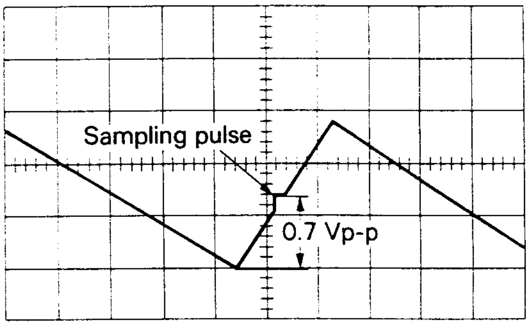

GND
SHORT
IC401
pin9
R452
TP223
TP214
FREQUENCY COUNTER
DC POWE SUPPLY

VIDEO & AUDIO CIRCUIT BOARD (Pattern Side View)

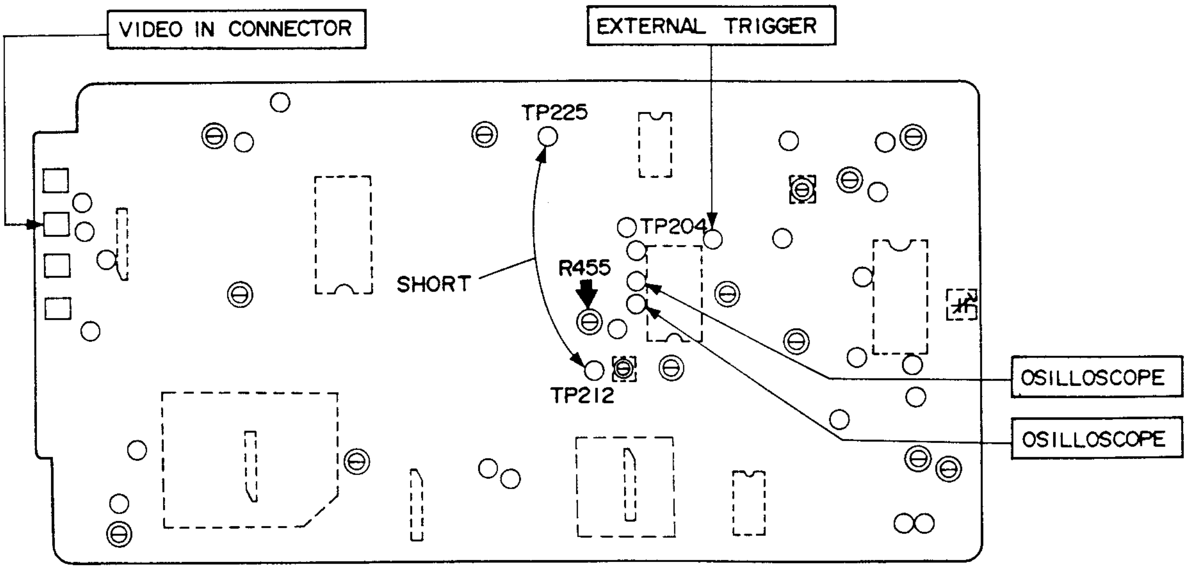
6. STILL VCO

Adjustment Location	Measuring Point	Measuring Equipment	Conditions of Adjustment
R455	TP226 TP227	Oscilloscope	REC/EE mode

(1) Set up the VTR in the REC/EE mode.
(2) Supply the staircase colour bar signal to the VIDEO LINE IN connector.
(3) Connect TP212 to TP225.
(4) Set up the oscilloscope so that it is triggered by the HD pulse TP204.
(5) Set the oscilloscope to the 2-channel mode and set their ranges to the same level.
(6) Set the oscilloscope to the ADD mode, connect ACH to TP226, and inverse BCH to connect to TP227.
(7) Turn R455 (STILL VCO) to adjust the pulse sampling position.



Horizontal Axis: 10 μs/div Vertical Axis: 0.5 V/div

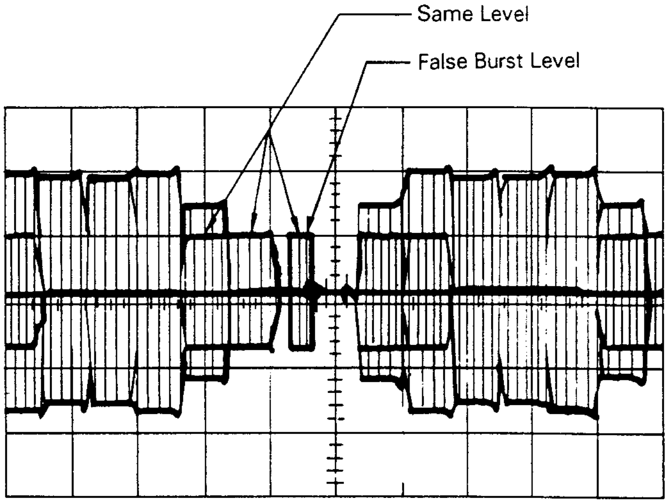

VIDEO IN CONNECTOR
EXTERNAL TRIGGER
TP225
TP204
SHORT
R455
TP212
OSILLOSCOPE
OSILLOSCOPE

VIDEO & AUDIO CIRCUIT BOARD (Pattern Side View)

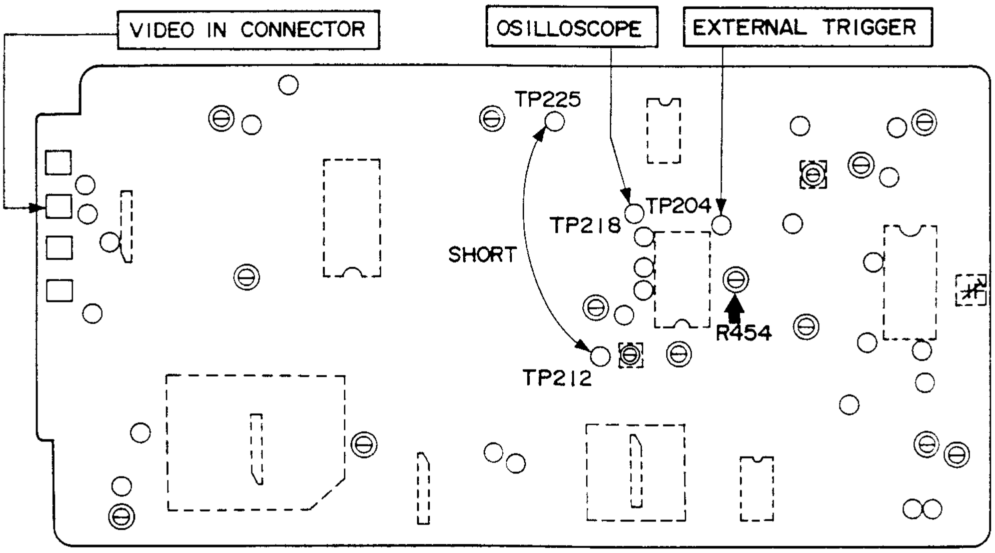
7. FALSE BURST GAIN

Adjustment Location	Measuring Point	Measuring Equipment	Conditions of Adjustment
R454	TP218	Oscilloscope	REC/EE mode

(1) Set up the VTR in the REC/EE mode.
(2) Supply the colour bar signal to the VIDEO LINE IN connector.
(3) Connect TP212 to TP225.
(4) Set up the oscilloscope so that it is triggered by the HD pulse TP204.
(5) Connect Oscilloscope ACH to TP218 and turn R454 (BURST CONV) so that the false burst level becomes the same as the color signal level.



Horizontal Axis: Axis 10 μs/div
Vertical Axis: 0.1 V/div

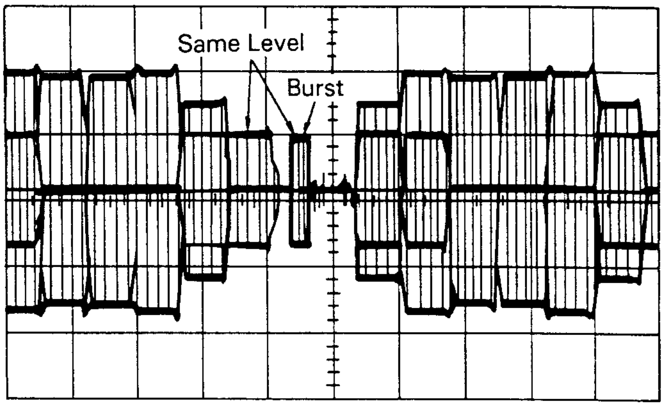

VIDEO IN CONNECTOR
OSILLOSCOPE
EXTERNAL TRIGGER
TP225
SHORT
TP218
TP204
R454
TP212

VIDEO & AUDIO CIRCUIT BOARD (Pattern Side View)

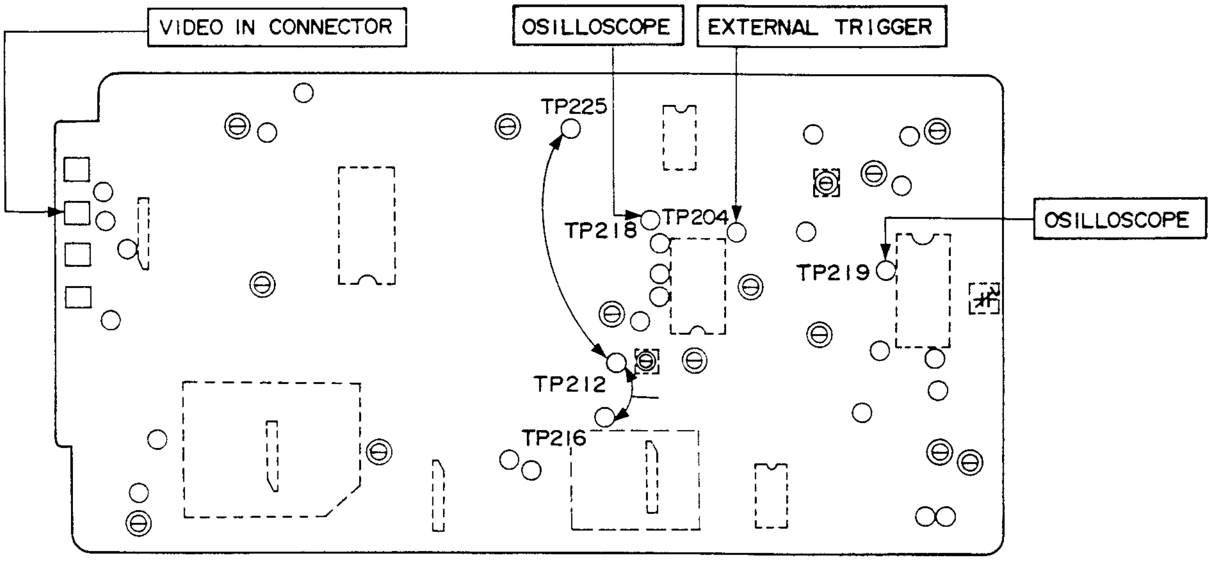
8. STILL IH DELAY GAIN

Adjustment Location	Measuring Point	Measuring Equipment	Conditions of Adjustment
R456	TP218	Oscilloscope	REC/EE mode

(1) Set up the VTR in the REC/EE mode.
(2) Supply the staircase colour bar signal to the VIDEO LINE IN connector.
(3) Connect TP212 and TP216 to TP225 (+6.5 V line).
(4) Set up the oscilloscope so that it is triggered by the HD pulse TP204.
(5) Connect oscilloscope ACH to TP218.
(6) TP217 is connected to ground.
(7) Turn R456 so that the colour signal level becomes the same as the false burst level.



Horizontal Axis: 10 μs/div
Vertical Axis: 0.1 V/div

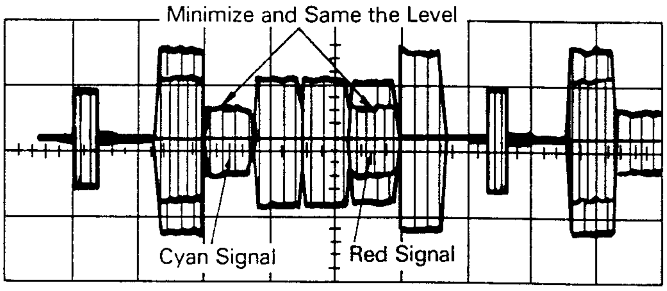

VIDEO IN CONNECTOR
OSILLOSCOPE
EXTERNAL TRIGGER
TP225
TP218
TP204
TP219
OSILLOSCOPE
TP212
TP216

VIDEO & AUDIO CIRCUIT BOARD (Pattern Side View)

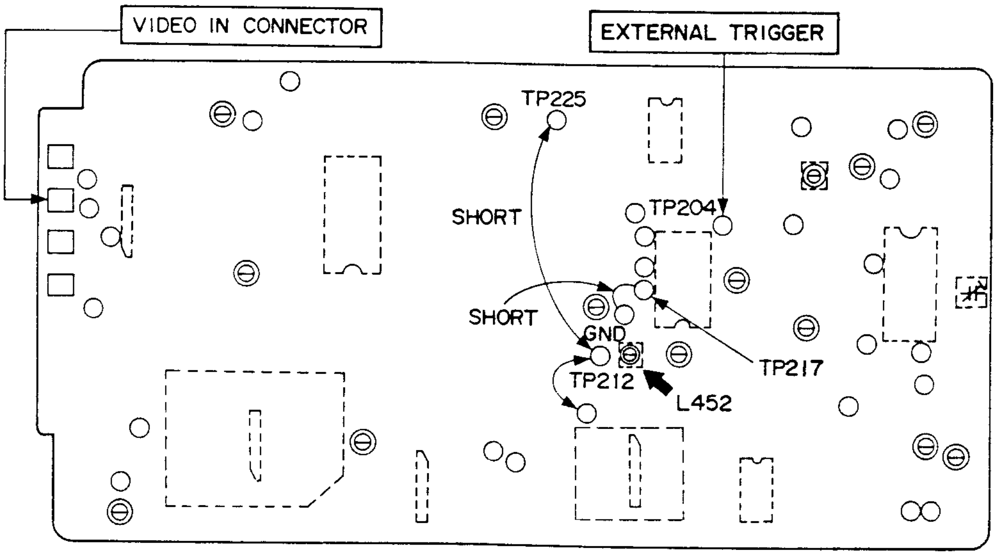
9. STILL IH DELAY GAIN

Adjustment Location	Measuring Point	Measuring Equipment	Conditions of Adjustment
R452	TP209 TP218	Oscilloscope	REC/EE mode

(1) Set up the VTR in the REC/EE mode.
(2) Supply the colour bar signal to the VIDEO LINE IN connector.
(3) Connect TP212 and TP216 to TP225 (+6.5 V line).
(4) Set up the oscilloscope so that it is triggered by the HD pulse TP204.
(5) Connect oscilloscope ACH to TP209 and BCH to TP218.
(6) Connect TP217 to GND.
(7) Adjust the gain of BCH so that ACH and BCH color signal levels become the same.
(8) Set the oscilloscope to the ADD mode.
(9) Turn L452 so that cyan and red signal levels become minimum.



Horizontal Axis: Axis 10 μs/div
Vertical Axis: 0.5 V/div


VIDEO IN CONNECTOR
EXTERNAL TRIGGER
TP225
SHORT
TP204
SHORT
GND
TP212
L452
TP217

VIDEO & AUDIO CIRCUIT BOARD (Pattern Side View)

PLAYBACK PREAMPLIFIER CIRCUIT ADJUSTMENT METHOD

1. PLAYBACK FREQUENCY RESPONSE HEAD A, HEAD B

Adjustment Location	Measuring Point	Measuring Equipment	Conditions of Adjustment
R151 (A) R152 (B)	TP101 (TP203)	Oscilloscope	PLAY mode

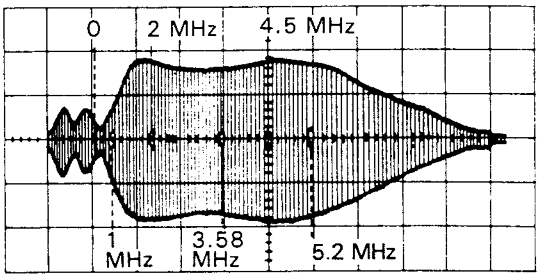
If the waveform between 2.0 and 5.2 MHz is not flat, picture quality will become poor.

(1) Play back the sweep section of alignment tape.

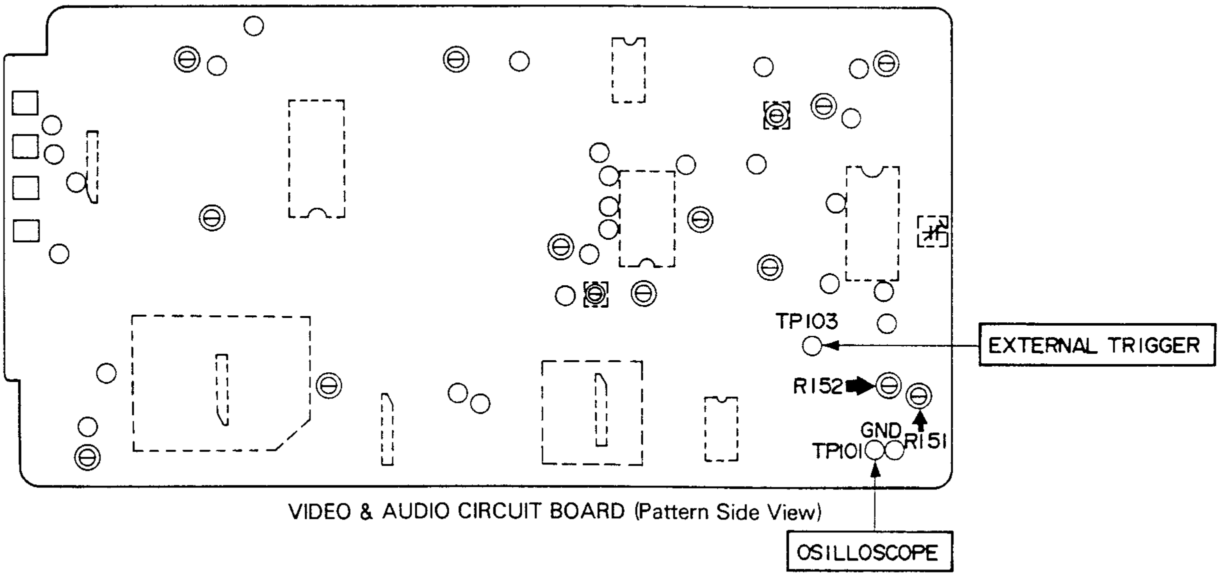
(2) Connect the probe of the oscilloscope to TP101 and its external trigger terminal to TP103.

(3) Set the oscilloscope to external (−) trigger when adjusting R151 (playback frequency response A). Set it to external (+) trigger when adjusting R152 (playback frequency response B).

(4) Adjust R151 and R152 so that the waveform between 2.0 and 5.2 MHz is as flat as possible for both channels.



Horizontal Axis: 2 ms/div
Vertical Axis: 0.1 V/div



VIDEO & AUDIO CIRCUIT BOARD (Pattern Side View)

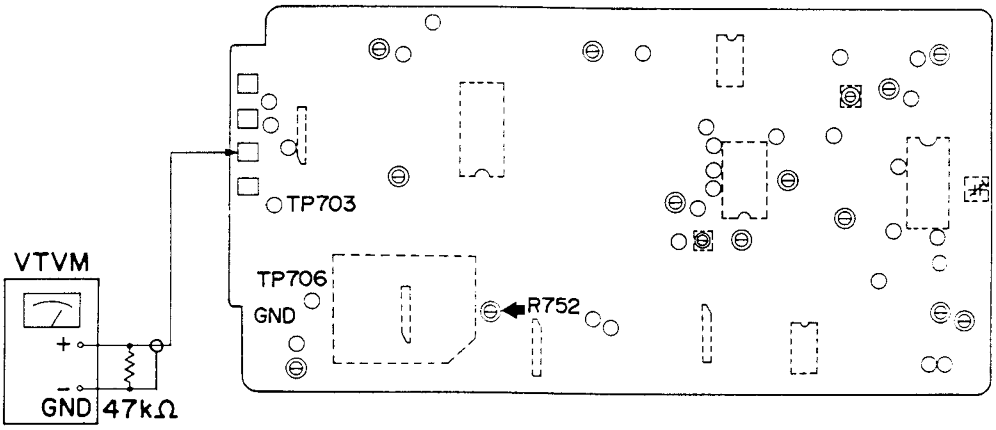
AUDIO CIRCUIT ADJUSTMENT

1. PLAYBACK FREQUENCY RESPONSE

Adjustment Location	Measuring Point	Measuring Equipment	Conditions of Adjustment
Checking	AUDIO LINE OUT	VTVM (AC range)	PLAY mode

If the waveform of 5 kHz section is larger than one of 333 Hz section, the high pitched sound is emphasized.
If the waveform of 333 Hz section is larger than one of 5 kHz section, the low pitched sound is emphasized.

(1) Place a 47 kΩ resistor between across the AUDIO LINE OUT terminal.
(2) Set R752 to the mechanical center.
(3) Playback the 333 Hz and 5 kHz section of the alignment tape.
(4) Confirm that the playback output level at 5 kHz is about 0.7 times as high as the playback output level at 333 Hz.



VIDEO & AUDIO CIRCUIT BOARD (Pattern Side View)

CAUTION (1)
When the playback frequency response does not normal, recheck from item 1 to 6 after completing the azimuth adjustment and the height adjustment of Audio Control Head.

CAUTION (2)
When recording the audio signal, record the video signal at the same time.
If the video signal is not recorded, the tape speed becomes unsteady.

2. PLAYBACK OUTPUT LEVEL

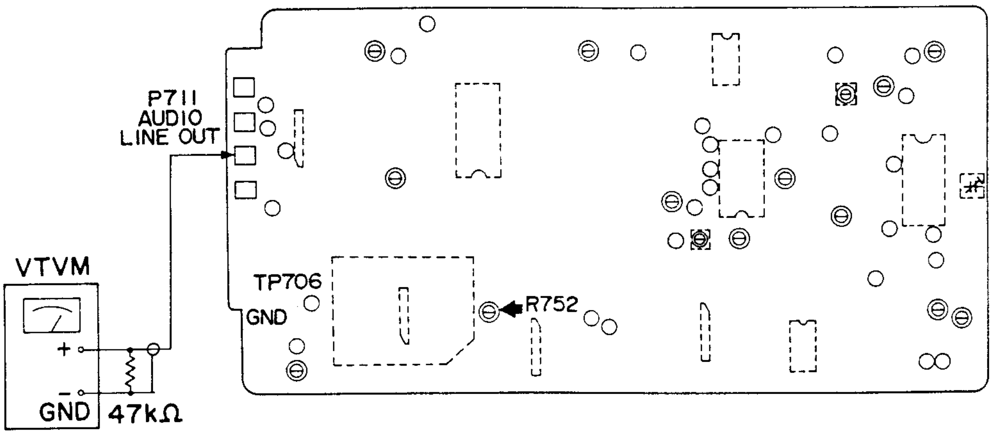
Adjustment Location	Measuring Point	Measuring Equipment	Conditions of Adjustment
R752	AUDIO LINE OUT	VTVM (AC range)	PLAY mode

If the voltage is too large, sound is too loud.
If the voltage is too small, sound is too low.

(1) Place a 47 kΩ resistor across the AUDIO LINE OUT terminal.

(2) Playback the 1 kHz section of the alignment tape.

(3) Adjust R752 until the VTVM reads 0.43 Vrms, playback output level.



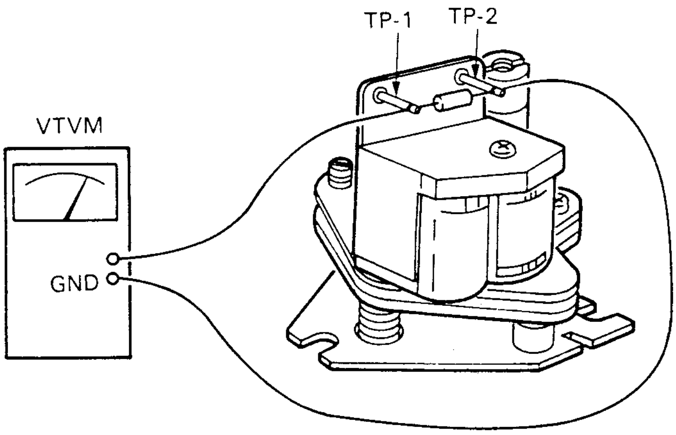
VIDEO & AUDIO CIRCUIT BOARD (Pattern Side View)

3. BIAS CURRENT

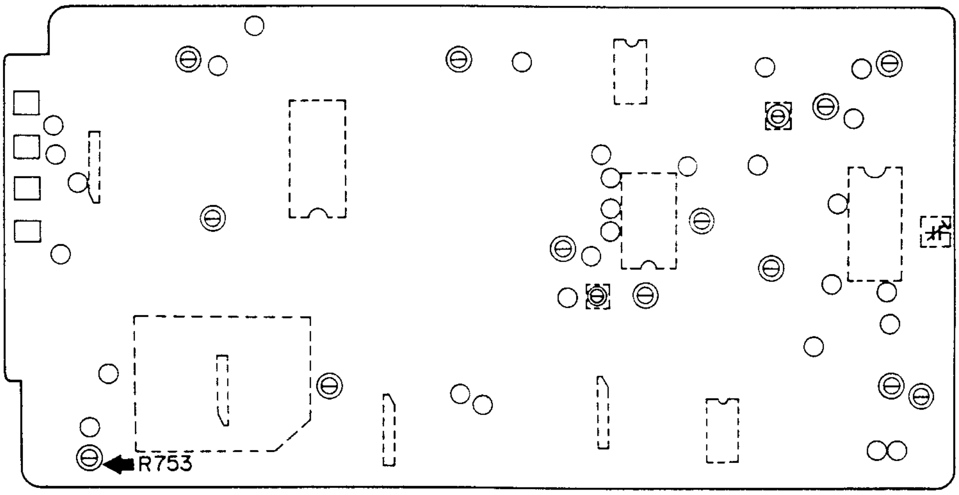
Adjustment Location	Measuring Point	Measuring Equipment	Conditions of Adjustment
R753	TP-1 TP-2	VTVM	REC mode

If the waveform of 5 kHz section is larger than the one of 333 Hz section, the high pitched sound is emphasized.
If the waveform of 333 Hz section is larger than the one of 5 kHz section, the low pitched sound is emphasized.

(1) Set the VTR in no-signal input state.
(Insert plug in audio in jack with nothing connected to it.)
(2) Connect the positive lead of the VTVM to Audio head P.C Board TP1 and the negative lead to TP-2.
(3) Adjust R753 until the VTVM reads 1.9 mVrms.



AUDIO CONTROL HEAD ASSEMBLY

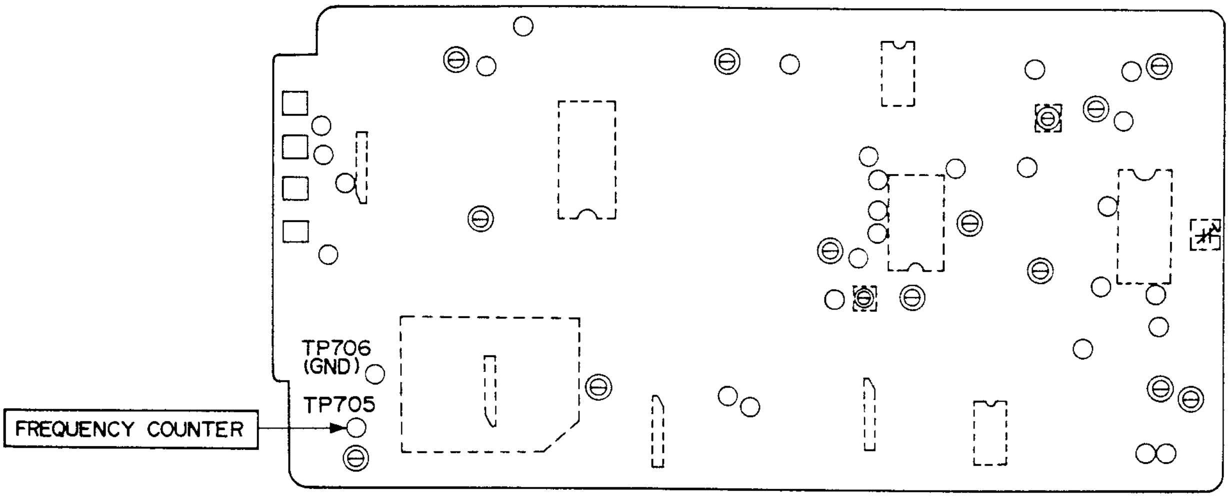


VIDEO & AUDIO CIRCUIT BOARD (Pattern Side View)

4. RECORDING ERASE OSCILLATION FREQUENCY

Adjustment Location	Measuring Point	Measuring Equipment	Conditions of Adjustment
Checking	TP705 TP706 (Ground)	Frequency Counter	REC mode

(1) Connect the frequency counter to TP705 and TP706 (GND).
(2) Set the VTR in Recording mode.
(3) Make sure that the frequency counter display is 65 kHz ±6.5 kHz.



VIDEO & AUDIO CIRCUIT BOARD (Pattern Side View)

5. RECORD-PLAYBACK OUTPUT LEVEL

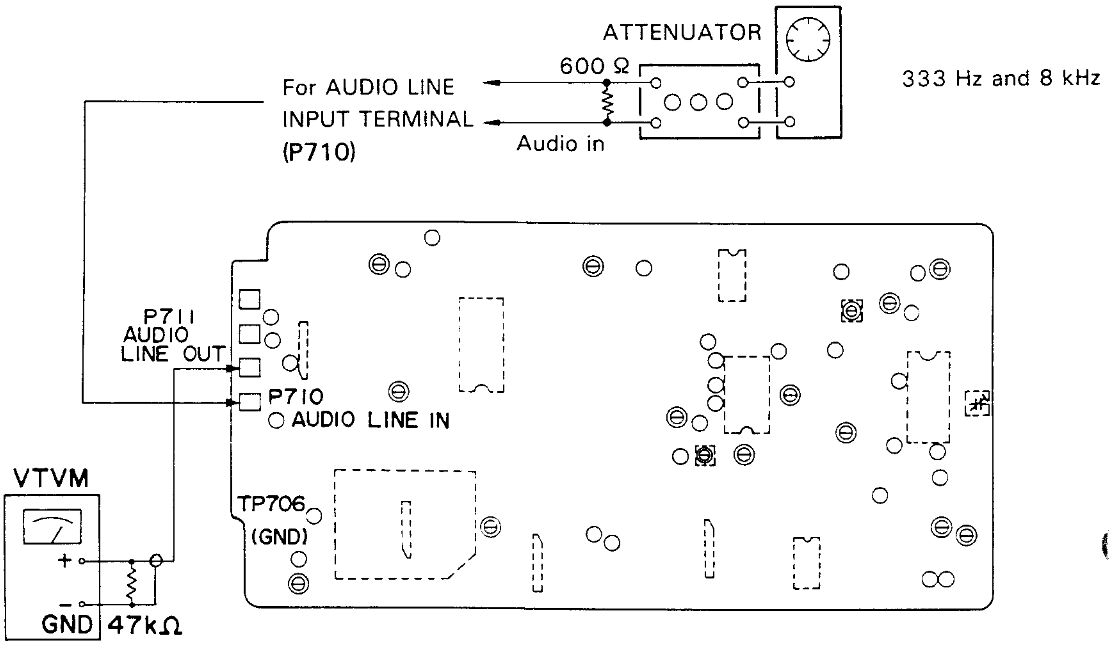
Adjustment Location	Measuring Point	Measuring Equipment	Conditions of Adjustment
Checking	AUDIO LINE OUT	VTVM Audio oscillator Audio attenuator	REC/PLAY mode

(1) Connect a 47 kΩ resistor and the VTVM to AUDIO LINE OUT.

(2) Inter connect the audio oscillator, audio attenuator and 600 Ω resistor to Line Input Terminal (P710) shown below.

(3) Record and playback the input of the audio reference signal, 333 Hz 245 mVrms.

(4) Make certain that play output level is 435 mVrms (580 mVrms—365 mVrms).


ATTENUATOR
600 Ω
333 Hz and 8 kHz
For AUDIO LINE INPUT TERMINAL (P710)
Audio in
P711 AUDIO LINE OUT
P710
AUDIO LINE IN
TP706 (GND)
VTVM
+
−
GND
47kΩ

VIDEO & AUDIO CIRCUIT BOARD (Pattern Side View)

6. RECORD-PLAYBACK FREQUENCY RESPONSE (1)

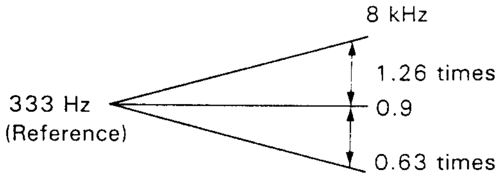
Adjustment Location	Measuring Point	Measuring Equipment	Conditions of Adjustment
Checking	TP703 (AUDIO LINE OUT)	VTVM Audio oscillator Audio attenuator	REC PLAY mode

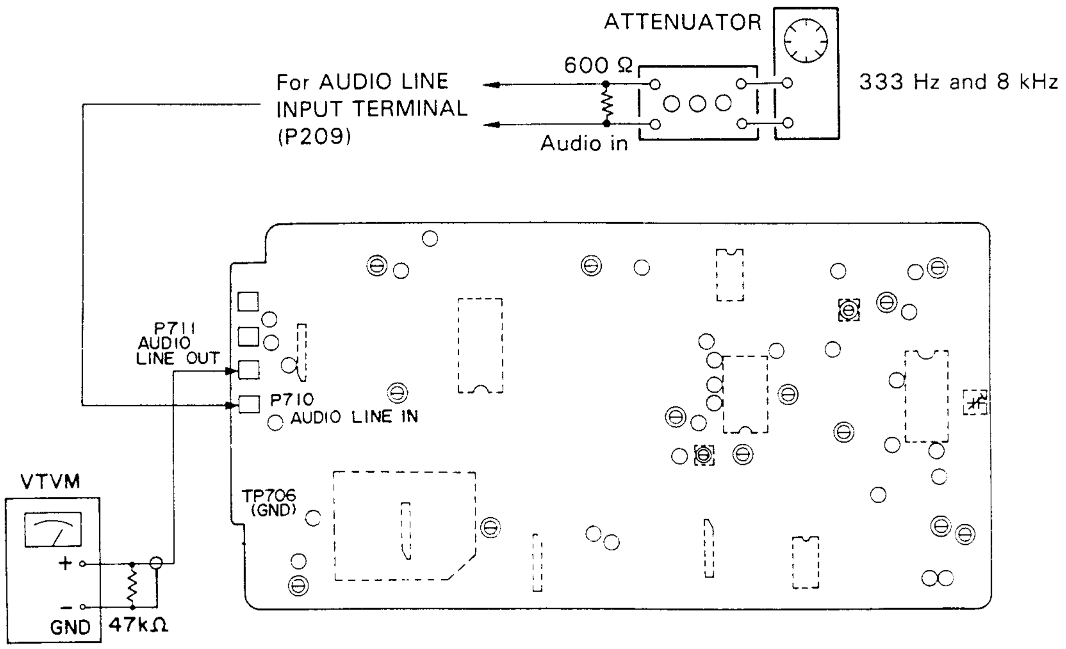
(1) Inter connect the audio oscillator, audio attenuator, and 600 Ω resistor, to the LINE INPUT terminal (P710) on the VTR and a 47 kΩ resistor and a VTVM to AUDIO LINE OUT as shown below.

(2) Record reference audio signal of the 333 Hz and 8 kHz audio signal of 43 mVrms, (−25 dBs).

(3) Check to insure that the 8 kHz playback output level read by the VTVM is between 0.63 times and 1.26 times (within −1 ±3 dB) as referenced to the 333 Hz playback output level.

(4) If the difference between 8 kHz playback output level and 333 Hz playback output level is more than 1.26 times, increase the bias current on previous item No. 3 to more than 1.9 mVrms, and if the difference is less than 0.63 times, reduce the bias current on previous item No. 3 to less than 1.9 mVrms, thus make certain the playback output level at 333 Hz and 8 kHz is between 0.63 times and 1.26 times.


8 kHz
1.26 times
0.9
333 Hz
(Reference)
0.63 times


ATTENUATOR
600 Ω
For AUDIO LINE
INPUT TERMINAL
(P209)
Audio in
333 Hz and 8 kHz
P711
AUDIO
LINE OUT
P710
AUDIO LINE IN
TP706
(GND)
VTVM
+
−
GND
47kΩ

VIDEO & AUDIO CIRCUIT BOARD (Pattern Side View)

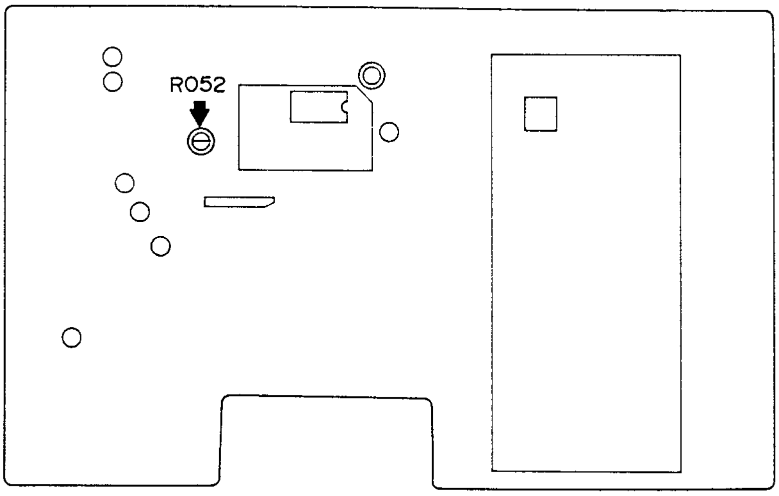
PIF. SELECTOR CIRCUIT ADJUSTMENT METHOD

1. AGC DELAY

Adjustment Location	Measuring Point	Measuring Equipment	Conditions of Adjustment
R052	TV Screen		EE mode

If R052 is turned too far clockwise, TV monitor will have buzz in the sound.
If R052 is turned too far counter clockwise, picture quality may become poor.

(1) Turn R052 fully clockwise.
(2) Turn R052 slowly counterclockwise until noise and sound buzz are minimized.



VIDEO & AUDIO CIRCUIT BOARD (Part Side View)

SECTION 3. MECHANICAL ADJUSTMENTS

3-1. GENERAL

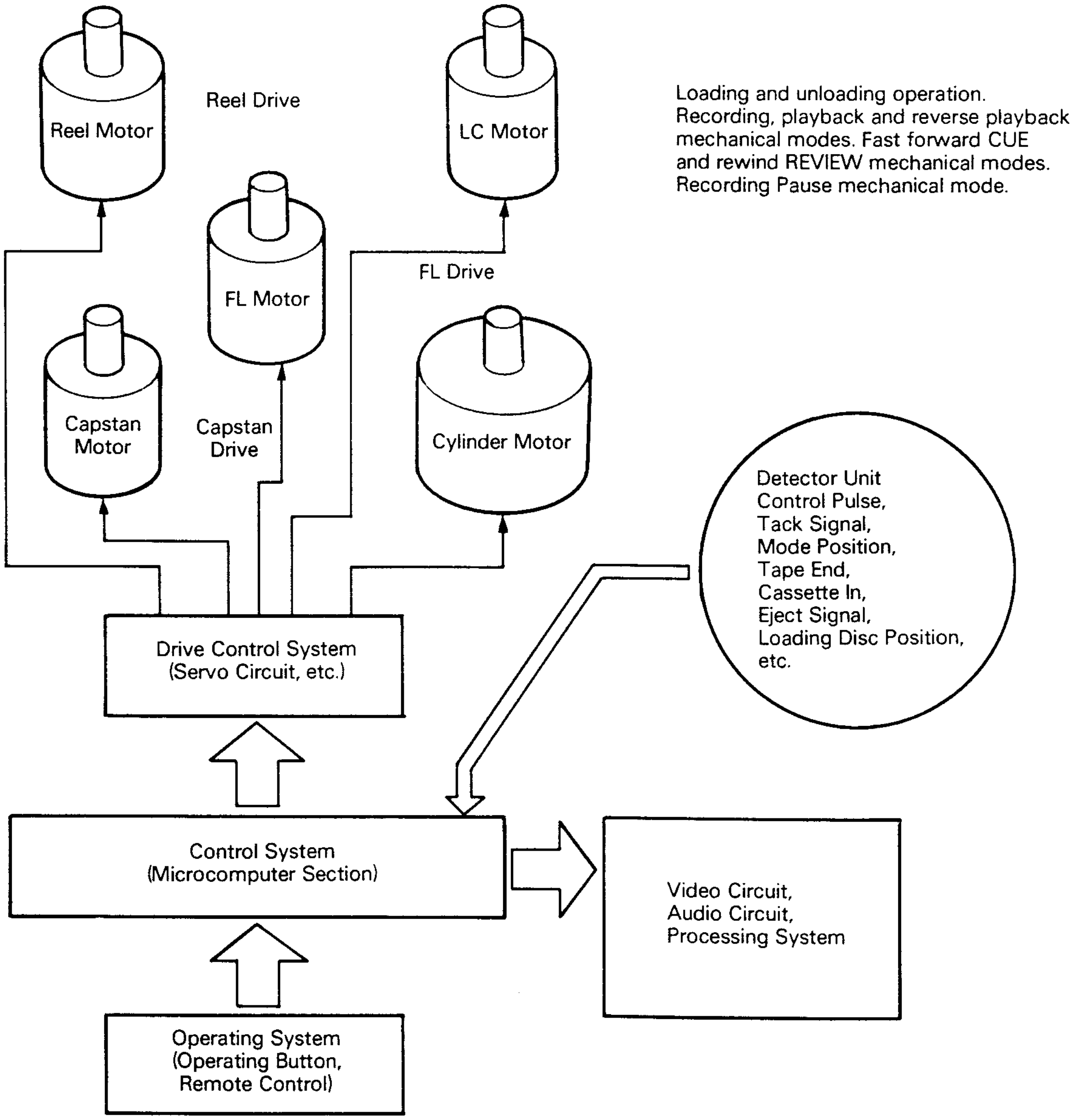
The unit is much easier to operate due to its compactness, light weight, low power consumption, and front loading system.

Additionally, unit depth has been significantly reduced when compared with conventional units.

1. The unit includes a total of five motors to power the, a) video head, b) capstan, c) reel, d) the loading cam, and front loading drive (hereinafter referred as an FL drive motor).
2. Utilizing a single slide cam operated by the above-mentioned cam mechanism in conjunction with reel motor rotation, reel drive determines various reel modes. Only idlers (no belts) are used.
3. Capstan motor rotation is monitored solely by the capstan FG. A moter pulley and a flat belt need not be replaced for adjusting the tape speed.
4. The cassette is front loaded automatically by the FL motor. To eject, simply depress the eject button and it is ejected in a like manner.
   The special playback includes a STILL mode and a variable speed picture search mode.
5. Component parts of the mechanism deck are subassembled and such subassemblies are mounted on a solid aluminum base.
   Typical assembly examples are for loading, cam, reel, and FL.

This unit has a solenoidless drive system adopted for the loading drive motor so as to serve a loading/unloading function and a function for the REC, PLAY, REW, FF modes, etc.

The cylinder mechanism, the capstan drive mechanism and the reel drive mechanism which greatly influence the performance of the VTR are driven by special motors, respectively, in order to achieve high performance.


Reel Motor
Reel Drive
LC Motor
Loading and unloading operation.
Recording, playback and reverse playback mechanical modes. Fast forward CUE and rewind REVIEW mechanical modes.
Recording Pause mechanical mode.
FL Motor
FL Drive
Capstan Motor
Capstan Drive
Cylinder Motor
Detector Unit
Control Pulse,
Tack Signal,
Mode Position,
Tape End,
Cassette In,
Eject Signal,
Loading Disc Position,
etc.
Drive Control System
(Servo Circuit, etc.)
Control System
(Microcomputer Section)
Video Circuit,
Audio Circuit,
Processing System
Operating System
(Operating Button,
Remote Control)

3-2 . MECHANICAL OPERATION

The LC DRIVE UNIT, REEL DRIVE UNIT, FAST-FORWARD, REWIND → STOP, PINCH LOCK MECHANISM EXPLANATION OF OPERATION IN THE VARIOUS MODES is same as model V-9600/B.

3-2-1 . FRONT LOADING

Front loading consists of slot-in, which carries the cassette from the opening to the reel stand, and of slot-out which carries the cassette from the reel stand back to the opening.

These two modes alternate according to the direction in which the drive motor rotates; the time required for each operation is about 1.5 s. The operations are detailed as follows:

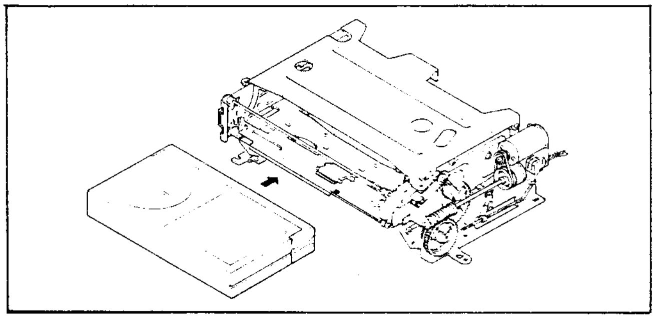


Fig. 3-1 **Front Loading Assembly**

(1) Solt-in

1. When the cassette is inserted in the cassette holder the right-hand and left-hand cassette detector switches, mounted on the underside of the cassette, are depressed by the bottom of the cassette and activated. When the cassette is inserted upside down, the projection of the left-hand side of the cassette holder stops the cassette, from being fully inserted in the cassette holder. As a result the cassette detector switches will not be activated.
   Additionally, if either the right-hand or left-hand ends of the cassette do not reach the innermost part of the cassette holder, only one of the detector switches will operate and as a result the motor will not operate.

NOTE:
The right-and left-hand cassette detector switches are connected in series to each other.

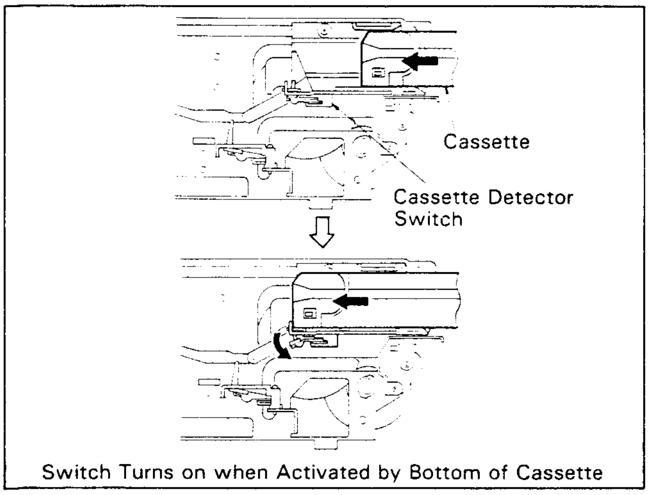

Cassette
Cassette Detector Switch
Switch Turns on when Activated by Bottom of Cassette

Fig. 3-2 **Operation of Cassette Detector Switch**

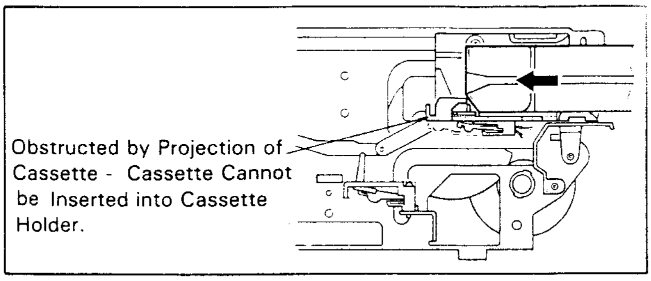

Obstructed by Projection of Cassette - Cassette Cannot be Inserted into Cassette Holder.

Fig. 3-3 **Improperly Insetted Cassette**

2. When the cassette is inserted in the cassette holder, the right- and left-hand cassette steadying springs, atop the cassette holder, and the right- and left-hand cassette stabilizing springs, on the underside of the cassette holder, bend in the direction of the arrow to secure and immobilize the cassette, within the cassette holder (Fig. 3-4).

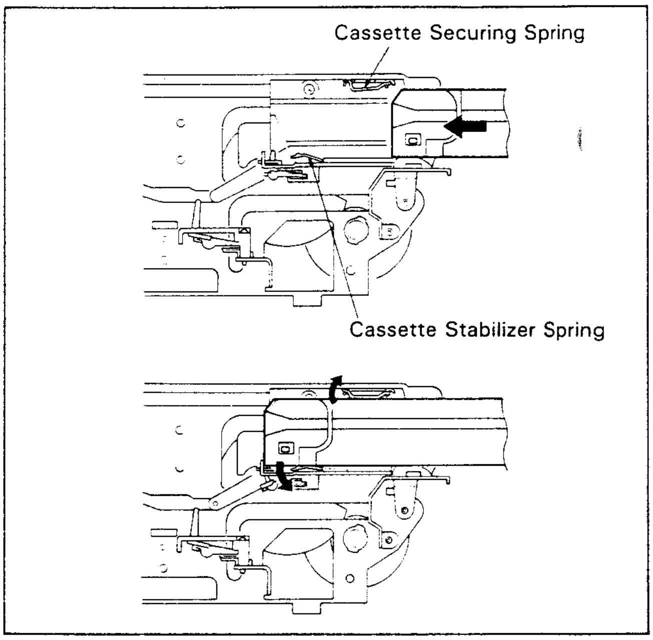

Cassette Securing Spring
Cassette Stabilizer Spring

Fig. 3-4 **Operation of Cassette Stabilizer Spring and Cassette Securing Spring**

3. When the right- and left-hand cassette detector switches activate the motor it rotates in the direction of the arrow (clockwise as seen from the front).
   Motor rotation is conveyed, via the belt, clutch, and worm, to the right and left gears rotating the arm and cam gear and as a result the cassette travels horizontally. (Fig. 3-5).

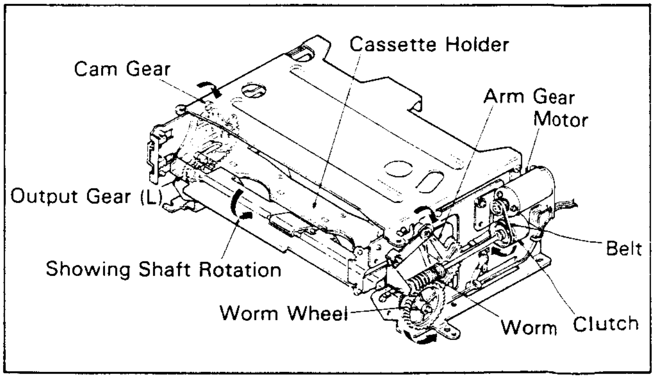

Cassette Holder
Cam Gear
Arm Gear
Motor
Output Gear (L)
Belt
Showing Shaft Rotation
Worm Wheel
Worm
Clutch

Fig. 3-5 **Operation of the Front Loading Mechanism**

4. During the horizontal movement of the cassette holder the cassette open lever moves in an arc along the guide groove of the guide bracket R to open the cassette lid (about 3 mm).
   At the final stage of the cassette holder's horizontal movement the cassette lid moves onto the cassette lid opener and opens wide as the cassette holder goes down (Fig. 3-6)

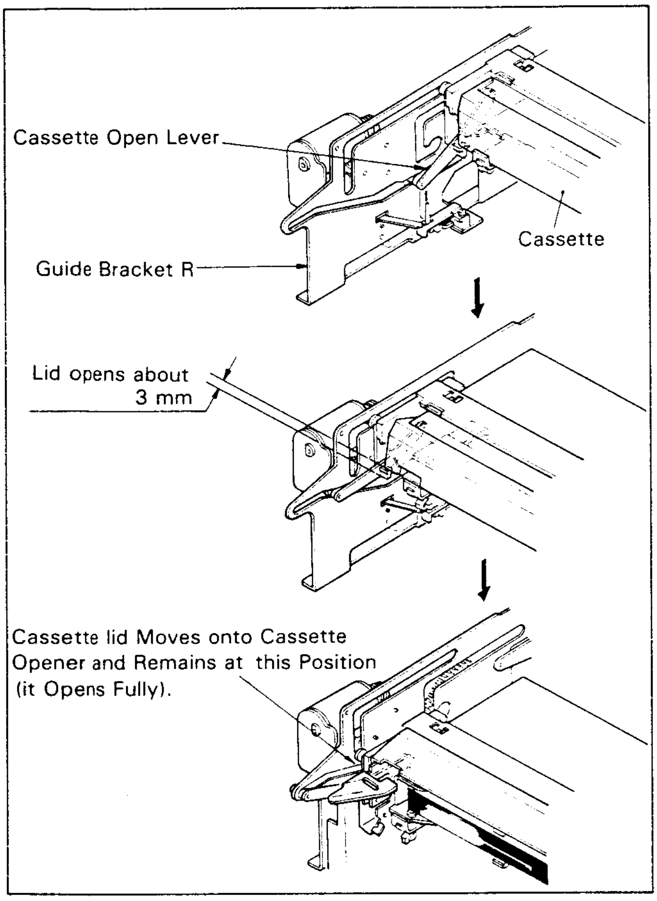

Cassette Open Lever
Cassette
Guide Bracket R
Lid opens about 3 mm
Cassette lid Moves onto Cassette Opener and Remains at this Position (it Opens Fully).

Fig. 3-6 Operation of Cassette Open Lever

5. The cassette is mounted on the cassette guide post. The motor stops when a signal from the ________ switch is received and slot-out is completed. (When the cassette has been pressed against the post by the right- and left-hand cassette lock springs the signal is sent.) (Fig. 3-7).

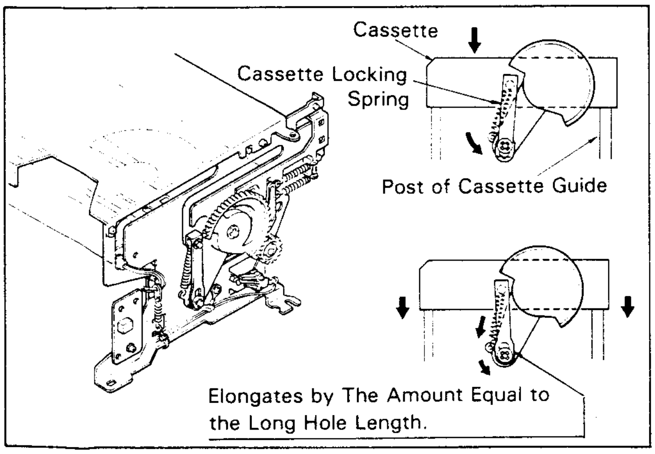

Cassette
Cassette Locking Spring
Post of Cassette Guide
Elongates by The Amount Equal to the Long Hole Length.

Fig. 3-7 Cassette Pressed against Cassette Guide Post

(2) Mechanism to Prevent Double Insertion

During the downward movement of the cassette holder the W prevention lever describes an arc in the direction of the arrow by the bottom of the cassette. Since the W prevention lever turns through an arc whenever the cassette is inserted, double cassette insertion is prevented (Fig. 3-8).

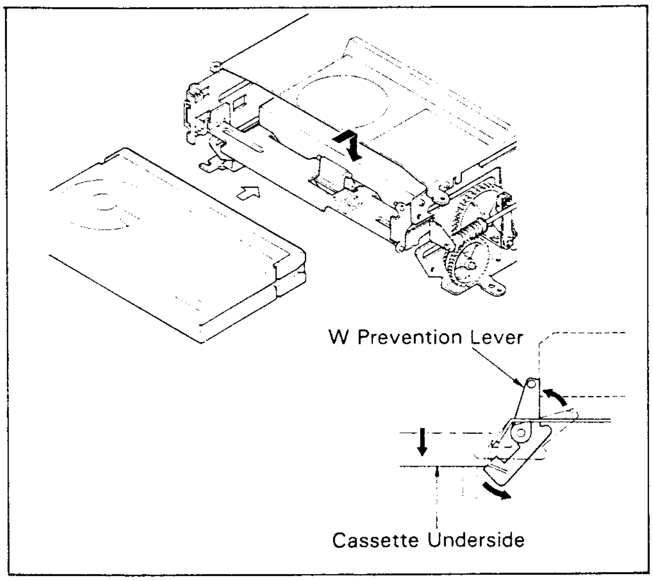

W Prevention Lever
Cassette Underside

Fig. 3-8 Operation of W Prevention Lever

(3) Slot-out

For slot-out the motor, as seen from the front, revolves in a counterclockwise direction (the opposite direction of the slot-in revolution), if the cassette eject button is depressed. During the upward movement of the cassette holder the door opening and closing lever moves in an arc along the cam of the cam gear, the door slider shifts in the direction of the arrow, and as a result the door opens.

When the horizontally traveling cassette holder reaches the stop position, the slot-out switch is activated by the cam on the cam gear stopping the motor (Fig. 3-9).

(4) Cassette Ejection

If, during slot-in, the cassette is out of position the cassette holder and either the right- or left-hand cassette detector switches is off, slot-in stops immediately. Even when the cassette detector switch remains on, if cassette movement is hindered by a foreign object that has got into the cassette holder or through other causes, the motor will revolve in the slot-out direction for four seconds and the cassette will then be discharged.

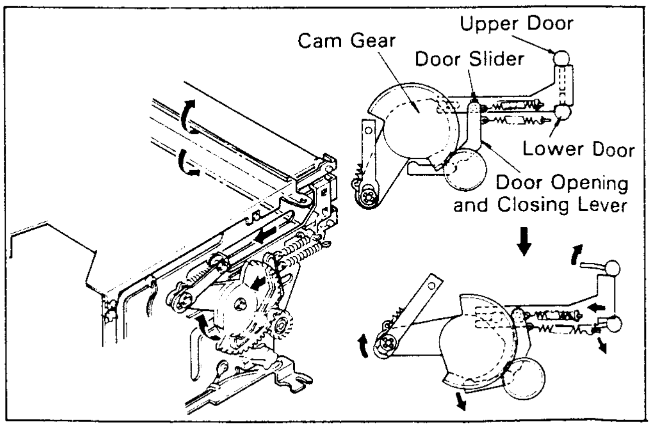

Upper Door
Cam Gear
Door Slider
Lower Door
Door Opening and Closing Lever

Fig. 3-9 Door Opening and Closing

3-3 . MECHANICAL ADJUSTMENT

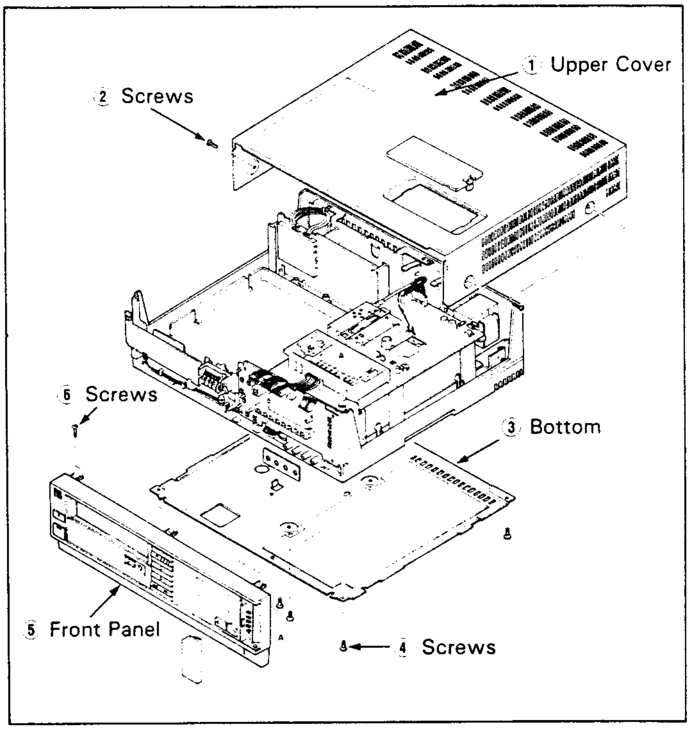
3-3-1 . CABINET (See Fig. 1)

Disassembly

1. Remove four screws ② of the upper cover ①.
2. Take the upper cover ① off by pulling toward the rear.
3. Remove three screws ④ to remove the bottom plate ③.
4. Remove three screws ⑥ of the front panel ⑤.

Assembly

To assemble the cabinet, reverse steps 1 through 4.



① Upper Cover
② Screws
⑥ Screws
③ Bottom
⑤ Front Panel
④ Screws

Fig. 1 Cabinet

3-3-2. FRONT LOADING ASSEMBLY (See Fig. 2)

(1) Removing and Installing Front Loading Assembly

Disassembly

1. Remove the top cover and front panel. (refer to Section 3-4-1)
2. Remove four screws ① which fasten front loading assembly ②, and lift the assembly directly up till it comes off
3. Remove connector ③ and ④.

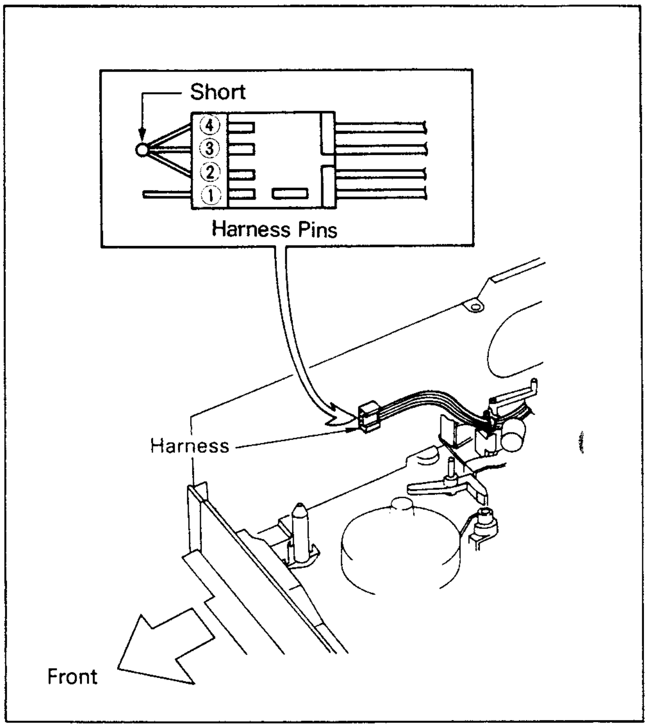
Assembly

To reassemble, reverse steps 1 through 3.

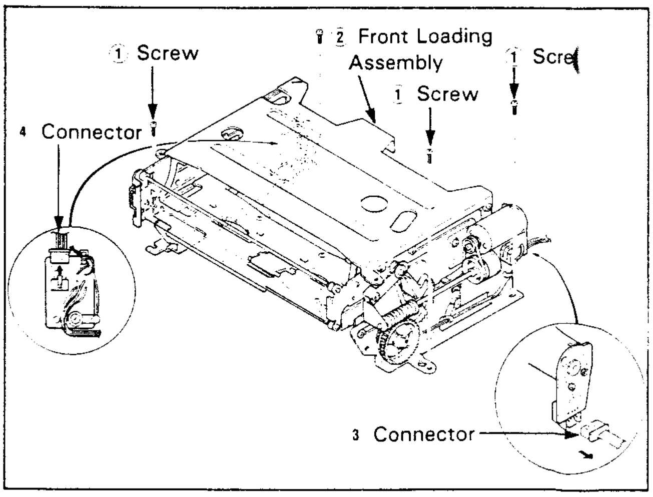
NOTE:

Loading or unloading after removing cassette holder.

1. Short circuit harness pins ②, ③ and ④ mounted on the front loading switch relay.
2. Switch power ON and push the eject button.
3. Switch OFF when unloading is completed.
4. Remove the means used for the short circuit.



Short
④
③
②
①
Harness Pins
Harness
Front



① Screw
② Front Loading Assembly
① Scre
① Screw
④ Connector
③ Connector

Fig. 2 Removing Front Loading Assembly

(2) Cassette Detect Switches (See Fig. 3)

Disassembly

1. Remove the front loading assembly. (refer to Section 3-4-2)
2. Place the front loading assembly upside down.
3. Unsolder the lead wires from cassette detect switch (L) ① and (R) ③.

NOTE:

At this stage, rotate clutch assembly ④ in the arrow direction manually to move cassette holder ② a little since it is difficult to unsolder the lead wire from cassette detect switch (L).

4. Remove screws ⑤ and ⑥.
5. Remove switches ① and ③.

Assembly

To reassemble, reverse steps 1 through 3.

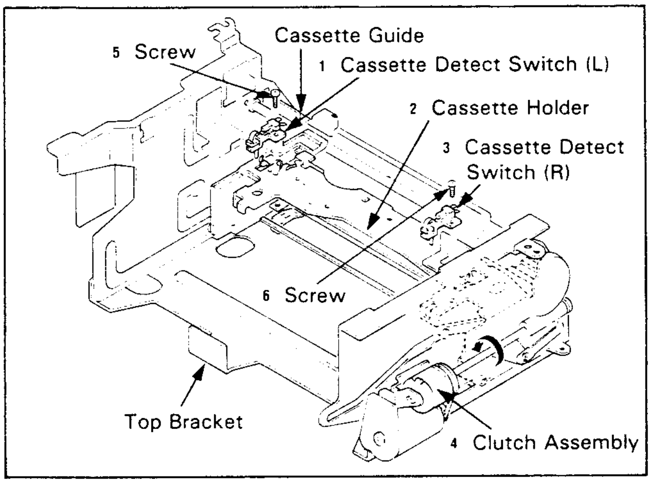

5 Screw
Cassette Guide
1 Cassette Detect Switch (L)
2 Cassette Holder
3 Cassette Detect Switch (R)
6 Screw
Top Bracket
4 Clutch Assembly

Fig. 3 Replacing Cassette Detect Switch

(3) Cassette Down Switch

Disassembly (See Fig. 4)

1. Remove the front loading assembly. (refer to Section 3-4-2)
2. Place the front loading assembly upside down.
3. Remove screw ③ and down switch bracket ④.
4. Remove screw ② and cassette down switch ①.
5. Unsolder the switch terminal.

Assembly

To reassemble, reverse steps 1 through 5.

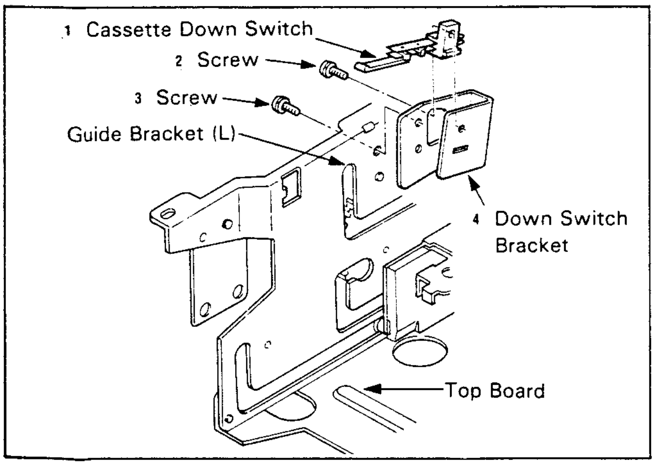

1 Cassette Down Switch
2 Screw
3 Screw
Guide Bracket (L)
4 Down Switch Bracket
Top Board

Fig. 4 Replacing Cassette Down Switch

(4) Slot Out Switch (See Fig. 5)

Disassembly

1. Remove the front loading assembly. (refer to Section 3-4-2).
2. Unsolder the switch terminal.
3. Remove screw ② and slot out switch ①.

Assembly

To reassemble, reverse steps 1 throgh 3.

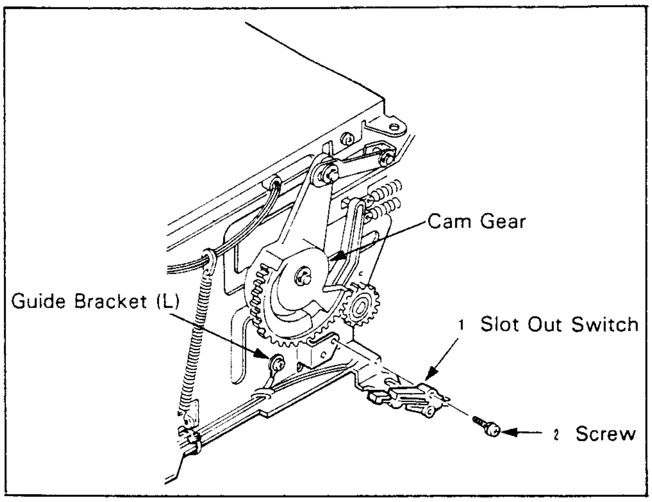

Cam Gear
Guide Bracket (L)
1 Slot Out Switch
2 Screw

Fig. 5 Replacing Slot Out Switch

(5) Error Erase Prevention Switch (See Fig. 6)

Disassembly

1. Remove the front loading assembly. (refer to Section 3-4-2)
2. Unsolder the switch terminal.
3. Insert a screwdriver ③ into hole in top board ② and remove screw.
4. Remove error erase prevention switch ①.

Assembly

To reassemble, reverse steps 1 throgh 4.

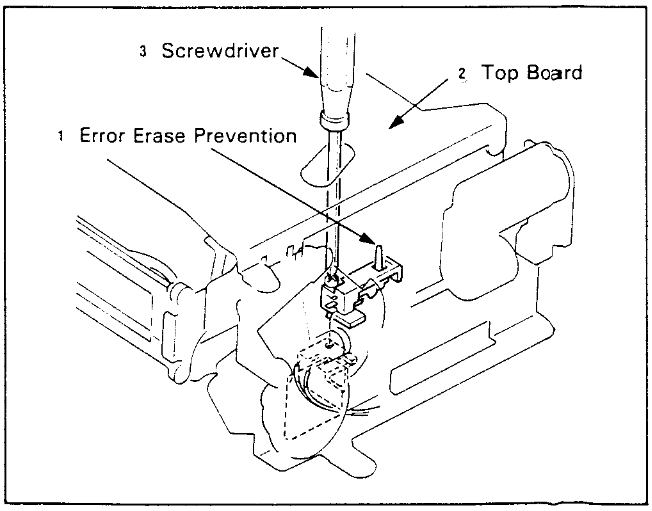

3 Screwdriver
2 Top Board
1 Error Erase Prevention

Fig. 6 Replacing Error Erase Prevention Switch

(6) Front Loading Motor and Belt (See Fig. 7)

Disassembly

1. Remove the front loading assembly. (refer to Section 3-4-2)
2. Remove screw ② securing front loading motor assembly ① to guide bracket (R) ⑦, and remove motor assembly ① and belt ⑤.

NOTE:
When removing front loading motor assembly①, be careful not to lose polyethylene slider ⑥ and bearing ④.

3. Unsolder unit ③ from motor terminal.

Assembly

To reassemble, reverse steps 1 throgh 3.

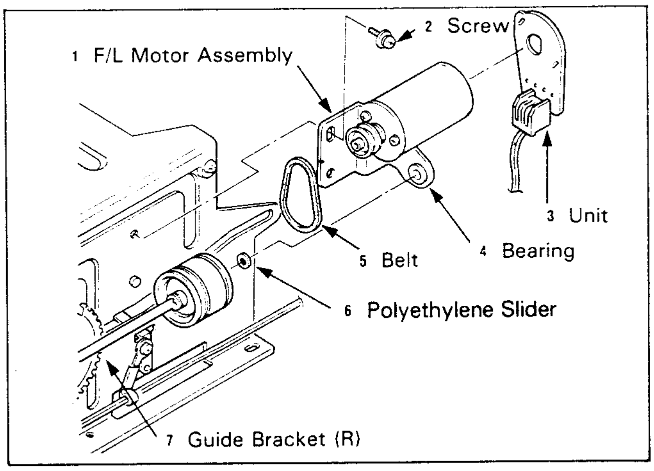

1 F/L Motor Assembly
2 Screw
3 Unit
4 Bearing
5 Belt
6 Polyethylene Slider
7 Guide Bracket (R)

Fig. 7 Replacing Front Loading Motor and Belt Assembly

(7) Door (See Fig. 8)

Disassembly

1. Remove the front loading assembly. (refer to Section 3-4-2)
2. Remove screw ⑥ securing door bracket ④ to guide bracket (R) ⑤.
3. Remove door bracket ④, upper door ②, and lower door ③.

Assembly

Reverse steps 1 throngh 3 above.

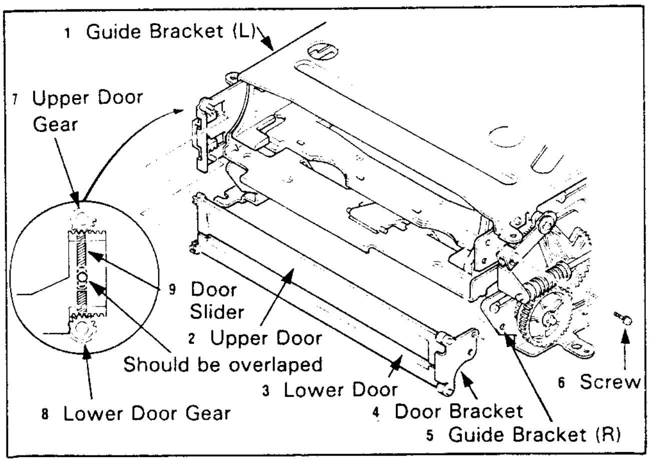

1 Guide Bracket (L)
7 Upper Door Gear
9 Door Slider
2 Upper Door
Should be overlaped
3 Lower Door
6 Screw
8 Lower Door Gear
4 Door Bracket
5 Guide Bracket (R)

Fig. 8 Replacing Front Loading Door

NOTE:
When installing doors, mesh door gears ⑦, ⑧ and door slider gear ⑨ first, then the aperture of door slider ⑨ should be overlaped to the aperture of guide bracket (L) ①, and doors ②, ③ be closed.

3-3-3. CAPSTAN DRIVE ASSEMBLY

(1) Capstan Drive Belt

Dirty, scratched, or worn capstan drive belt, adversely affects the sound and picture quality. The belt, therefore, should be periodically checked and replaced if needed, as directed below:

Checking

1. Check to insure that the belt is free of dirt, scratches, wear and excess elongation.
2. For dirt, clean the belt using isopropyl alcohol. For scratches, wear, or excess elongation, replace it.

Disassembly (See Fig. 9)

1. Remove two screws ① holding thrust bearing bracket ②.
2. Lift thrust bearing bracket ② upward for remov
3. Remove capstan drive belt ④.

Assembly

Put capstan drive belt ④, on motor pulley ⑤ first.

CAUTION:

1. When installing capstan drive belt ④, the white mark should face outside.
2. Wipe new belt using isopropyl alcohol, before installation.
3. Put capstan drive belt ④ on capstan flywheel ③.
4. Put thrust bearing bracket ② in position.
5. Tighten two screws ①.

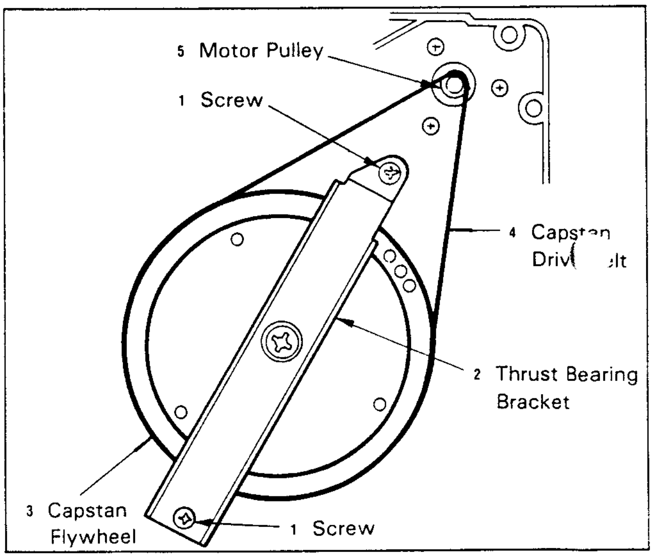

5 Motor Pulley
1 Screw
4 Capstan Drive Belt
2 Thrust Bearing Bracket
3 Capstan Flywheel
1 Screw

Fig. 9 Capstan Drive Belt

(2) Capstan Motor (See Figs. 9, 10, 11)

1. Remove capstan drive belt ④ from motor pulley ⑤.
2. Disconnect connector P505 on the servo • logic circuit board.
3. Remove three screws ⑦ and remove capstan motor ⑥ from cylinder base 8.

Assembly
Reverse steps 1 through 3 above.

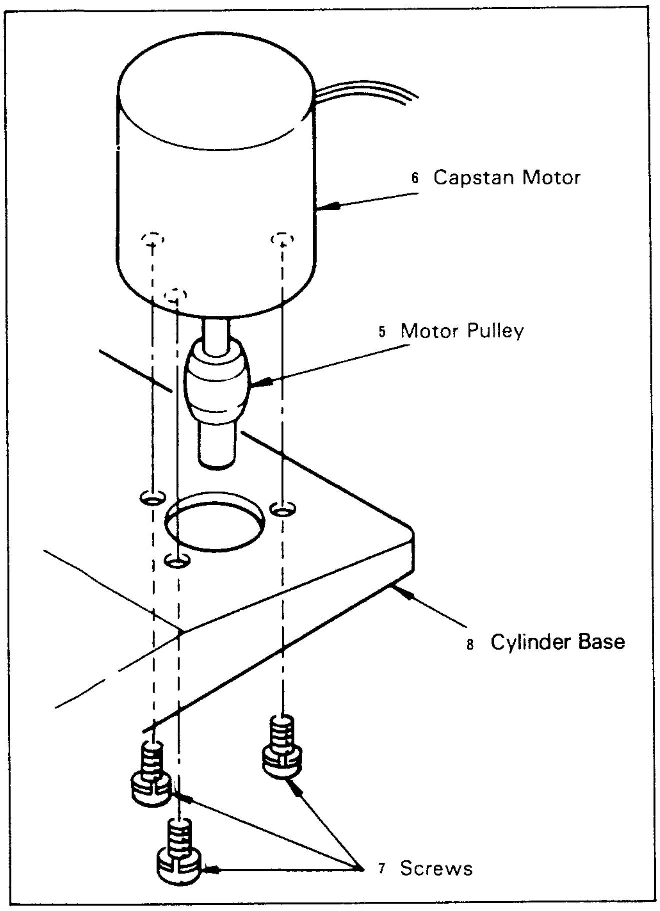


Fig. 10 Capstan Motor

(3) Capstan FG Coil Assembly (See Figs. 9, 11)

Disassembly

1. Unplug connector P-503 from the servo • logic circuit board.
2. Loosen two screws ① and remove thrust bearing bracket ②. (See Fig. 9)
3. Remove capstan drive belt ④.

NOTE:

Care must be taken not to damage the belt.

4. Remove capstan flywheel ③.
5. Remove screw ⑪ holding lead wire.
6. Remove three screws ⑫ and remove FG coil assembly ⑨.

Assembly

To assemble, reverse steps for disassembly. Jigs must be used to mount FG coil assembly ⑨.

1. Temporarily fit FG coil assembly ⑨ loosely to cylinder base 8 using three screws ⑫.
2. Insert jig (A) ⑬ into capstan sleeve ⑭, and insert jig (B) ⑮ into jig (A) ⑬. Then, adjust the coaxial line of tack plate ⑯ of FG coil assembly ⑨, and tighten three screws ⑫ securely to completely fix FG coil assembly ⑨.

NOTE:

Take plate ⑯ is fixed by caulking as a part of FG coil assembly ⑨. Care should be taken not to damage it. Be very careful to avoid damaging the edge.

3. Tighten screw ⑪ to hold lead wire.
4. Take out jig ⑬ and jig ⑮ and insert capstan flywheel ③. At this time, make certain that the external peripheries of shaft and flywheel are not dirty or oily. After inserting capstan flywheel into capstan sleeve ⑭, clean the running suface of tape and remove bearing metal oil, etc.
5. Put the flat belt of capstan in position. (See Fig. 9).
6. Mount thrust bearing bracket ② using two screws ①.
7. Plug connector ⑩ into P-503 of the servo • logic circuit board. Make certain that the coil is not disconnected.
   Also when installing the board, make certain that the lead wires and other parts do not to touch the revolving portions such as the motor and flywheel.

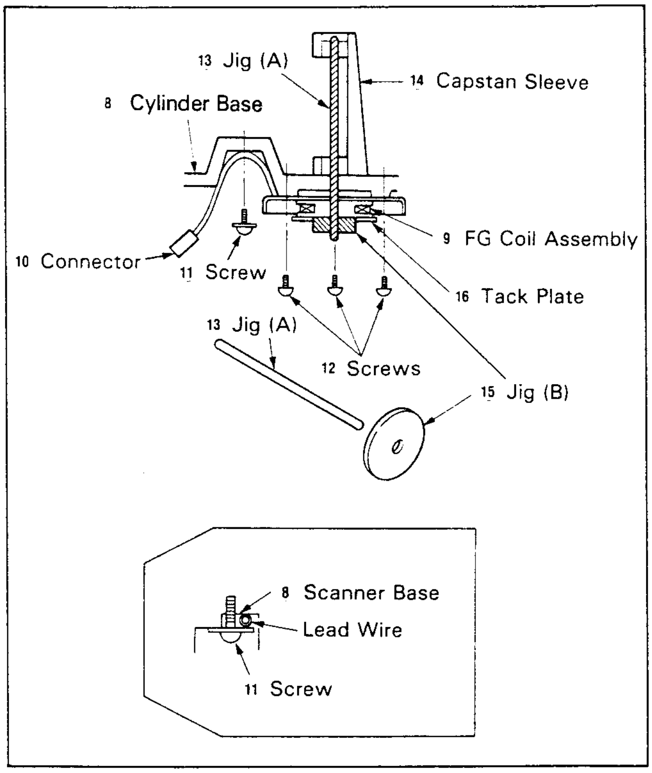


Fig. 11 Capstan FG Coil Assembly

3-3-4. LOADING CAM DRIVE SECTION

The loading drive assembly and associated arrangements, if not adjusted correctly, will give too much tension to tape, take too long for loading or unloading, or in some cases will result in no loading or unloading. In such cases, adjust as directed below:

(A basic condition of the loading and unloading mechanism is that the cam gear be in stationary mode.)

(1) Checking in loading mode

1. Put a cassette tape into the cassette compartment.
2. Make certain that the loading disk turns counterclockwise to bring the tape out.
3. Also, make certain that it fully loads in 3 seconds or less.
4. If not, check as follows:
   First, check whether the loading motor rotates. If not, the electric circuit can be suspected.

Check:

- Cassette in switch or cassette down switch
- Cam switch assembly
- Loading cam motor drive circuit
- Loading cam motor

5. If the loading motor is normal, but tape loading can not be accomplished or takes too long, then mechanical adjustment will be needed. Check the following items:
   a. When an abnormal state exists, such as the LC (loading and cam) belt coming loose or rides on the pulley flange, replace the belt or install it in its proper position and clean the belt and both pulleys with alcohol.
   b. Improper engagement of the loading disk with the loading gear.
   c. Make sure that the lock arm of the loading cam drive assembly is in unlocked condition.
   d. Make sure that the cam gear of the loading cam drive assembly is in stop mode position. If condition of the cam gear and ratchet release lever are as shown in Fig. 12, it will be normal. If not, correct according to the following procedure.
      d-1 Disengage the loading disk gear and the loading gear.
      d-2 Remove the front loading assembly and take-up reel table.
      d-3 Tilt lock release arm B in the arrow (→) direction and release the lock arm. Pushing the reverse prevention pawl in the arrow direction (→), turn the loading gear counterclockwise and confirm that the cam gear turns clockwise.
      d-4 Confirm that continuity exists between the CAM terminal and terminal A of the cam switch when the cam gear reaches the position as shown in Fig. 12.
      d-5 After the loading cam drive assembly is locked, tilt lock return arm B in the arrow direction (↗) and return the lock arm to its original position.
   e. Load on the loading disk
   Disengage the loading gear and disk gear, and turn the loading disk by hand to check whether it can be turned rather freely or not. The loading disk should turn rather easily.

CAUTION:
The four tabs must be used for turning the loading disk. Do not use the loading guide post, or it can be deformed.

6. If the loading disk cannot be turned easily, check:
   a. The disk guide roller and detector arm B roller can be rotated.
   b. The slider of the reel drive assembly should move back and forth easily.
   c. Clearance between the disk guide roller and the loading disk.
   d. The tension sub arm and tension lever actuate normally.
   e. The tape slack detector lever should catch on the loading disk.
   f. The cassette lid opener assembly should not be touched by the loading disk. (Touching the pinch roller cap is normal)
   g. Condition of the pinch oscillation plate.
   h. Clearance between the pinch lock plate of the pinch roller lock assembly and the surface of the loading disk cam.
7. After completing the above check, rearrange the loading disk gear and loading gear so that they can be engaged properly.
8. Move the loading cam drive assembly. If the tape cannot be normally loaded even after checking and adjustment are completed as directed above, then check LC belt.
9. If the loading belt is good, then replace the loading cam drive assembly.

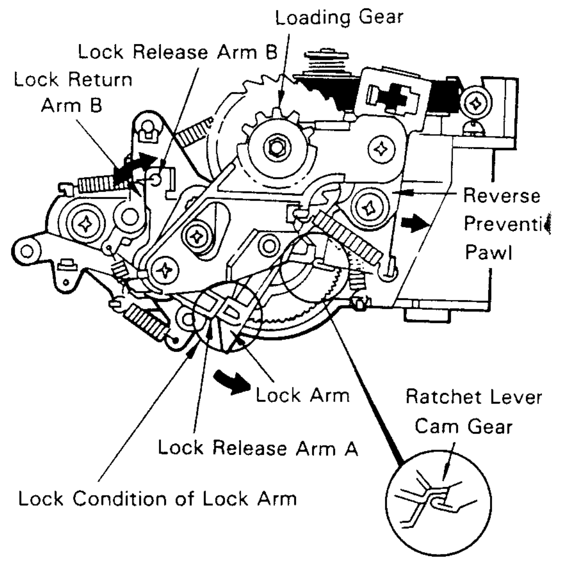


Fig. 12 Loading Cam Drive Assembly

(2) Checking in Unloading Mode

1. Press the EJECT button.
2. Make certain that the loading disk is turned clockwise and the tape is rewound into the cassette.
3. Also, make certain that it takes 5.5 seconds or less to fully unload the tape.
4. If not, check in the same way as in Item (1) "Checking in loading mode".
5. Also, check whether the variable angle cam rotates smoothly and the cam gear of the loading drive cam assembly is in stop mode position.

If the cam gear is not in the stop mode position, push the stop button or follow the steps in Item (1)-5 to put it in the stop mode position.

6. When the Fast Forward or REWIND button is pressed after loading, mechanical operation is as follows:
   a. The cam gear turns clockwise and the end of cam arm flutters.
   b. The slider of the reel drive chassis slides to front side.
   c. The idler becomes free.
   d. The brake levers move away from the supply and take up reel table.

If these operations are not correct, check as directed below:

- a. The lock arm of the loading cam drive assembly should be released completely.
- b. The slider of the reel drive assembly should move smoothly.
- c. Engagement of the cam arm with the cam link.

7. When pressing the PLAY button after loading hold the tape slack detect lever by hand. The mechanical operation is as follows:
   - a. The cam gear turns clockwise and the cam arm flutters.
   - b. The slider of the reel drive assembly slides to the scanner side.
   - c. The brake levers move away from the supply and take up reel table.
   - d. The tension sub arm shifts the tension arm to playback position by movement of the cam link.
   - e. The pinch roller is locked.

If these operations are not correct, check as directed below:

- a. The lock arm of the loading cam drive assembly should be released completely.
- b. The slider of the reel drive assembly should move smoothly.
- c. Engagement of the cam arm with the cam link.

(3) Disk Guide Roller Assembly

If the clearance between the loading disk and the guide roller of the disk guide roller assembly is too little or too large, this can cause high loads in loading or unloading. In some cases, loading or unloading will be impossible. Check and adjust as follows:

Checking (See Figs. 13, 14)

1. Loosen two screws 3 holding loading cam drive assembly 2 and disengage loading gear 6 from loading disk 1. (See Fig. 14)
2. By holding either of the four guide posts on the loading disk by hand, check to insure that the loading disk can freely rotate both in the loading direction (counterclockwise) and the unloading direction (clockwise).
3. Also, make certain that the loading disk tolerance is within 0.2 mm in the radial direction. (See Fig. 13)

Adjustment (See Fig. 13)

If the loading disk cannot be turned freely or is too loose, adjust the disk guide roller assembly as directed below:

1. Loosen screw 2 holding the disk guide roller assembly 1
2. Adjust the position of disk guide roller assembly 1 until loading disk 3 can be rotated freely as checked by one hand, while turning the disk guide roller assembly 1 in the arrow direction (➚) by the other hand.
3. Tighten screw 2 to hold the guide roller assembly 1, so that loading disk 3 has 0.2 mm radial clearance.
4. Make certain again that loading disk 3 can be rotated freely.

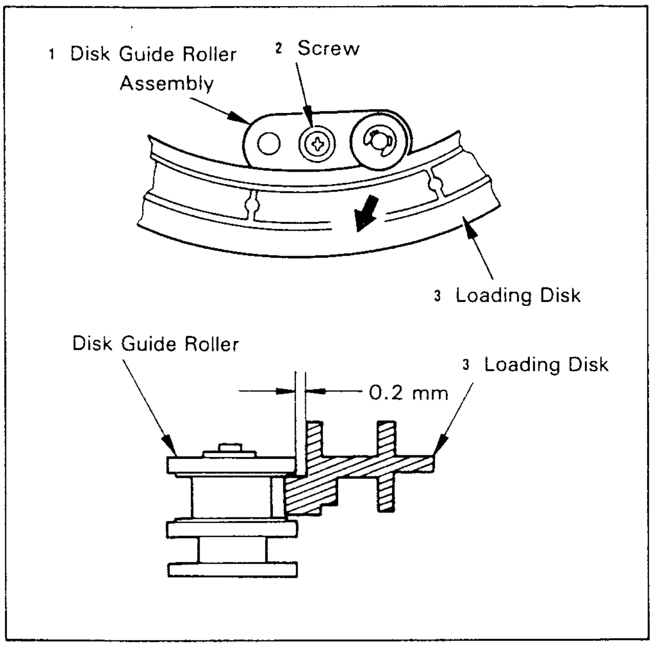


Fig. 13 Disk Guide Roller Assembly

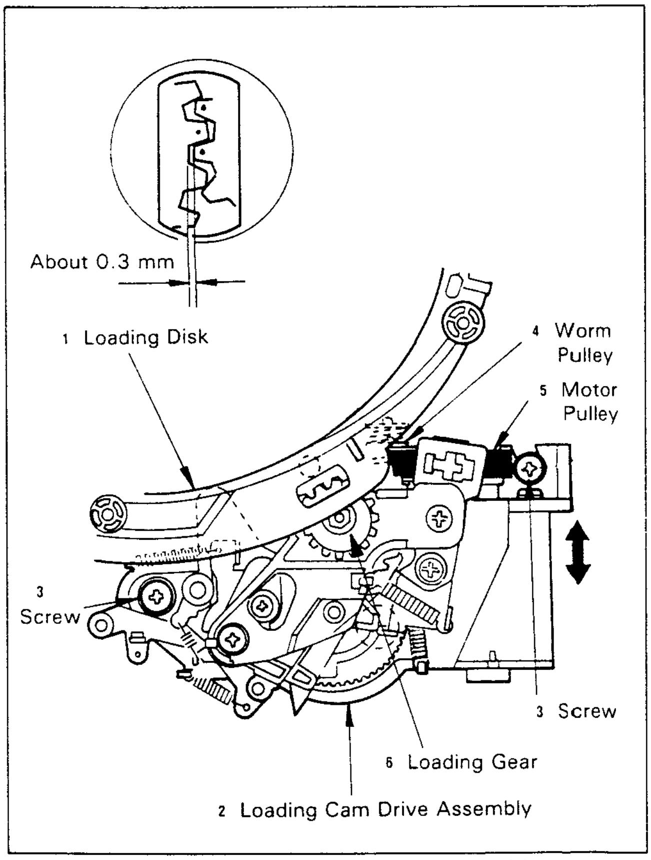


Fig. 14 Loading Cam Drive Assembly

(4) Checking and Adjusting the Gear Engagement of Loading Cam Drive Assembly and Loading Disk

If the top clearance between the tooth crest and bottom land of the gears of the loading cam drive assembly and the loading disk is too little, this can cause high loads in loading or unloading. In some cases, loading or unloading can be impossible. If the clearance is too large, on the other hand, the gears can be disengaged at the end of loading or unloading. Check and adjust as follows:

Checking (See Fig. 14)

1. Turn power switch off.
2. Remove the upper cover.
3. Rotate loading disk ① by turning motor pulley ⑤ or worm pulley ④ by hand until the state of gear engagement can be observed through peep hole of loading disk ①.
4. Check to insure that the top clearance is about 0.3 mm.

Adjustment (See Fig. 14)

If the top clearance is out of the standard, adjust the position of loading cam drive assembly ② as directed below.

1. Move loading disk ① to a position where its gear is engaged with that of loading cam drive assembly ②.
2. Loosen two screws ③ holding loading cam drive assembly ②.
3. Move loading cam drive assembly ② until the top clearance between the gears is about 0.3 mm.
4. Firmly tighten screws ③.

(5) Loading Motor Assembly (See Fig. 15)

Disassembly

1. Remove the loading cam drive assembly. [refer to Item (6)]
2. Remove loading belt ②.
3. Remove two screws ③ holding motor assembly ①.
4. Remove loading motor assembly ①.

Assembly

1. Reverse steps 1 through 4 above.
2. After installation, adjust the gear engagement of the loading cam drive assembly and the loading disk as in Item (4).
3. Also, adjust the lock release arm A and B and the reverse prevention pawl as in Item (9) and Item (10).

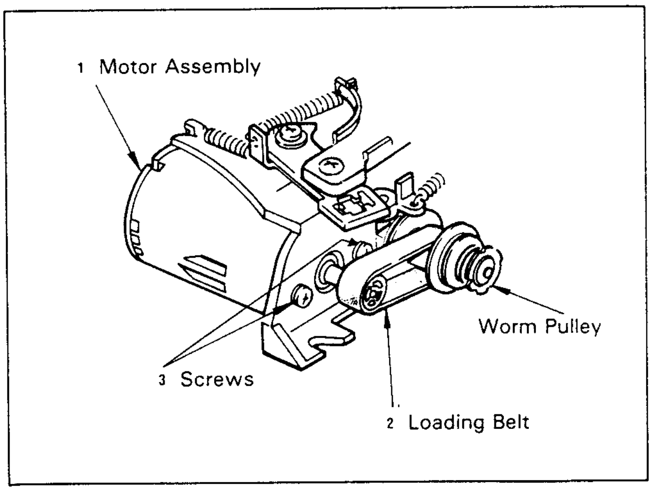


Fig. 15 Loading Motor Assembly

(6) Loading Cam Drive Assembly (See Figs. 16, 17)

Disassembly

1. Remove the front loading assembly. [refer to Section 3-4-2-(1)]
2. Loosen two screws ① holding loading cam drive assembly ② and disengage loading gear ③ of loading cam drive assembly ② from loading disk ④. (See Fig. 16)
3. By holding either of the four guide posts on loading disk ④ by hand, turn loading disk ④ until the position where there are no cams is directly over loading gear ③.
4. Remove take up reel table ⑥. (See Fig. 17)
5. Remove the cassette lid opener assembly.
6. Remove cam link ⑧. (See Fig 17)
7. Disconnect connectors P609 and P603 on the servo • logic circuit board.
8. Remove two screws ①. (See Fig. 16)
9. Remove loading cam drive assembly ②. (See Fig 16)

Assembly

1. Reverse steps 1 through 9 above.
2. After installation, adjust the gear engagement of the loading cam drive assembly and the loading disk as in Item (4).
3. Also, adjust the lock release arm A and B and the reverse prevention pawl as in Item (9) and Item (10).

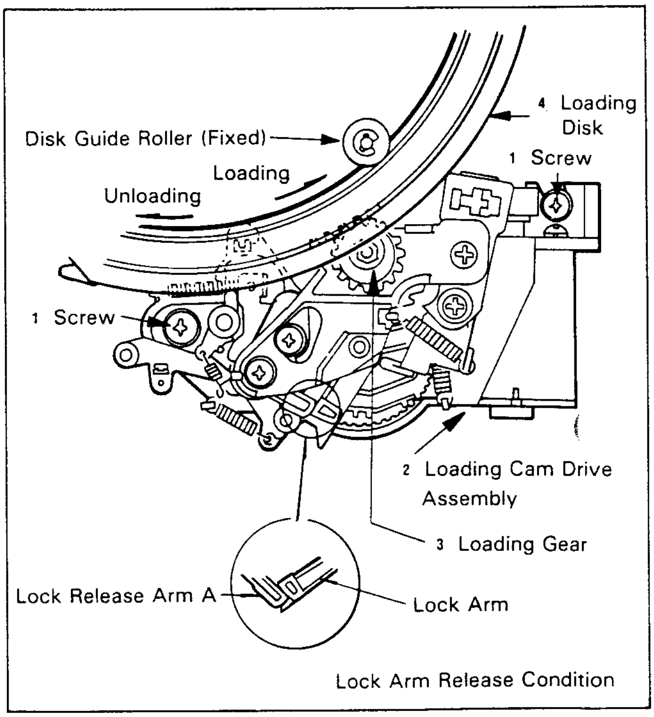


Fig. 16 Loading Cam Drive Assembly and Loading Disk

(7) Loading Disk Assembly (See Figs. 16, 17)

Disassembly

1. Remove the front loading assembly, [refer to Section 3-4-2-(1)]
2. Remove pinch oscillating plate ①. (See Fig. 17)

3. Remove unloading end detector Lever ② and detect arm B ③. (See Fig 17)
4. Loosen two screws ① holding loading cam drive assembly and disengage loading gear ③ of loading cam drive assembly ② from loading disk ④. (See Fig. 16)
5. By holding either of four guide posts on loading disk ④ by hand, turn loading disk ④ to the loading end position. (See Fig 17)
6. Loosen screw ⑤ and move disk guide roller assembly ⑩ in arrow direction (↓). (See Fig. 17)
7. Move tension lever ⑥ and arm shift lever ⑦ in arrow direction (↑) to keep them from loading disk ④.
8. Detach loading disk ④ from two fixed guide rollers ⑨ and remove gently by lifting the right side first.

CAUTION:

While removing loading disk ④, care should be taken not to touch the scanner.

Assembly

1. Reverse steps 1 through 8 above.
2. After replacement, perform the following adjustments.
   a. Adjust the disk guide roller assembly. [refer to Item (3)]
   b. Adjust the engagement of the loading disk and loading gear. [refer to Item (4)]
   c. Adjust the lock release arm A and B and the reverse prevention pawl. [refer to Item (9) and Item (10)]
3. After adjustment, confirm the loading time and unloading time and make certain that no defects are seen on the TV screen when the alignment tape is played back.

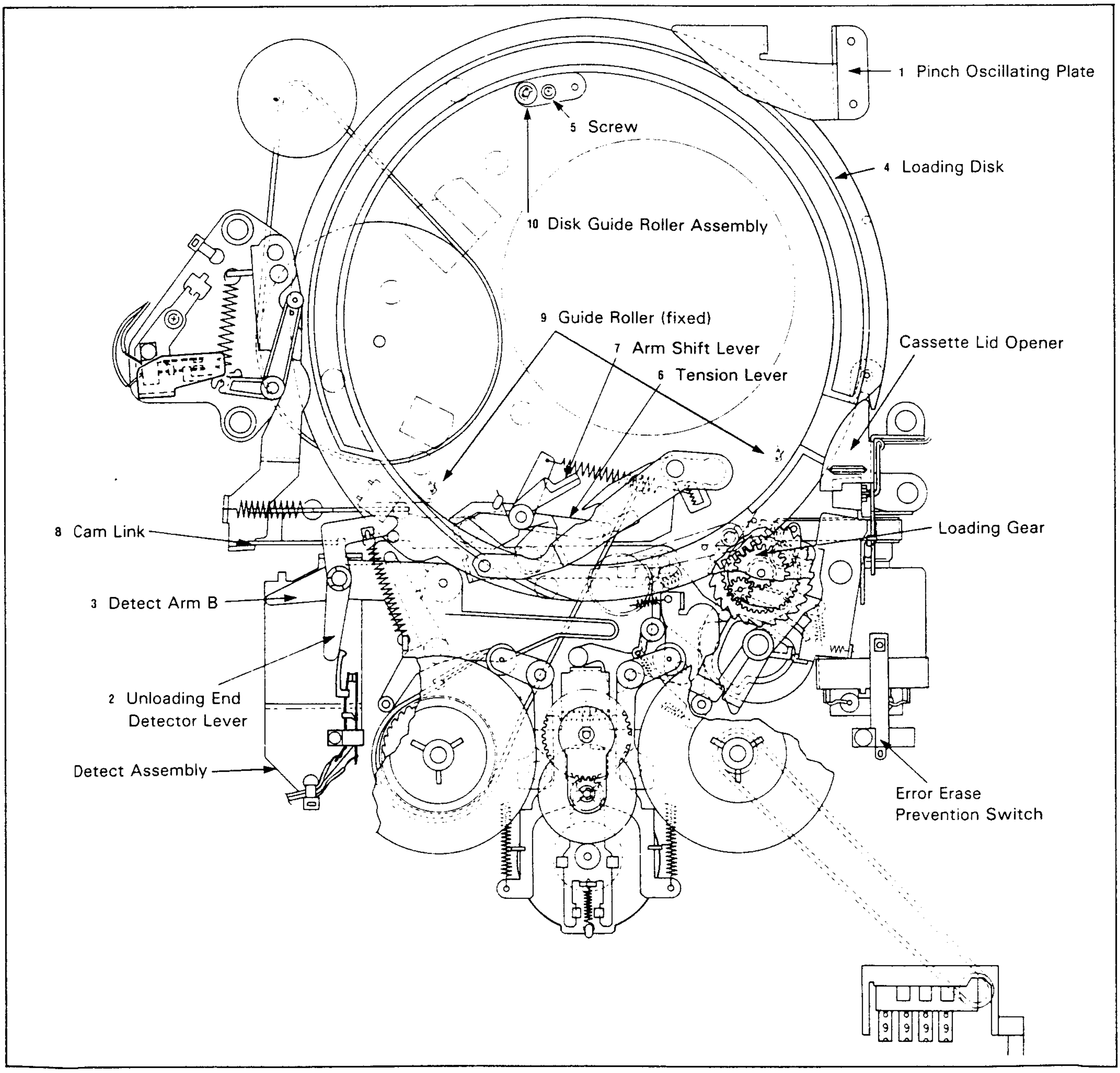

1 Pinch Oscillating Plate
5 Screw
4 Loading Disk
10 Disk Guide Roller Assembly
9 Guide Roller (fixed)
7 Arm Shift Lever
6 Tension Lever
Cassette Lid Opener
8 Cam Link
Loading Gear
3 Detect Arm B
2 Unloading End Detector Lever
Detect Assembly
Error Erase Prevention Switch
9
9
9
9

Fig. 17 Loading Disk Assembly

(8) Pinch Roller Lever Assembly (See Fig. 18)

Scratched, abraded, or loosely revolving pinch roller or guide roller can cause uneven tape wear. To prevent this problem, proceed as follows:

Checking

1. Check the pinch roller for dirt, scratches, abrasion, and axial looseness. For dirt, clean the pinch roller. For other defects, replace.
2. Turn the pinch roller by finger tips. The pinch roller should be rotated freely without any binding.
3. Make certain that the pinch roller lever is not loose axially and the pinch roller spring is not stretched.

Disassembly

1. Remove "E" ring 2 retaining pinch roller lever assembly 1 .
2. Lift pinch roller lever assembly 1 straight up for removal.
3. Wipe to clean the surface of the pinch roller and associated parts using isopropyl alcohol.

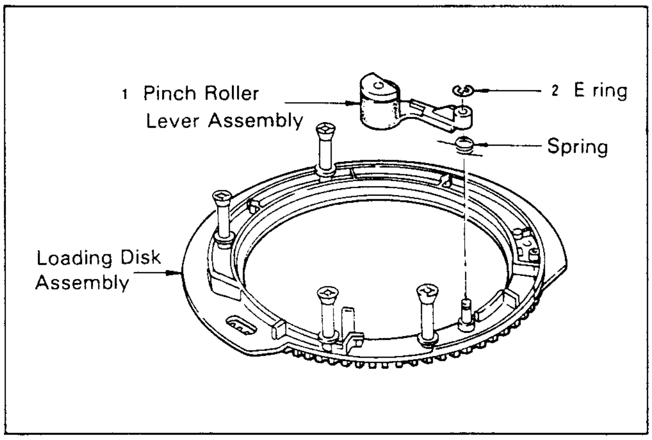

1 Pinch Roller Lever Assembly
2 E ring
Spring
Loading Disk Assembly

Fig. 18 Pinch Roller Lever Assembly

Assembly

1. Assemble pinch roller lever assembly 1 .
2. Playback the alignment tape and make certain that picture is properly reproduced.

(9) Lock Release Arm A and B

If the lock release arm A and B is not adjusted properly, the locking arm will be released before the loading disk reaches the loading end position and power will be switched over to the cam side.

Checking (See Fig. 19)

1. Remove the front loading assembly. [refer to Section 3-4-2-(1)]
2. Remove the take up reel table.
3. Set the VTR in the loading end state without cassette.
4. Make certain that lock arm 5 is in lock release condition and the clearance between lock release arm A 4 and lock arm 5 is 0.
5. Also, make certain that the loading disk cannot be turned any further in loading direction.

Adjustment (See Fig. 19)

1. Loosen screw 3 holding lock release arm B 2 .
2. Loosen screw 6 holding lock release arm A 4 .
3. By turning motor pulley 7 by hand, set the loading disk in loading end position, and hold it.
4. Turn lock release arm A 4 in the arrow direction (↘) to release lock arm 5 .
5. Make certain that lock release arm B 2 touches tab 1 on the cam way of the loading disk properly.
6. Tighten screw 6 while pushing lock release arm A 4 in the arrow direction (↗).
7. Tighten screw 3 .

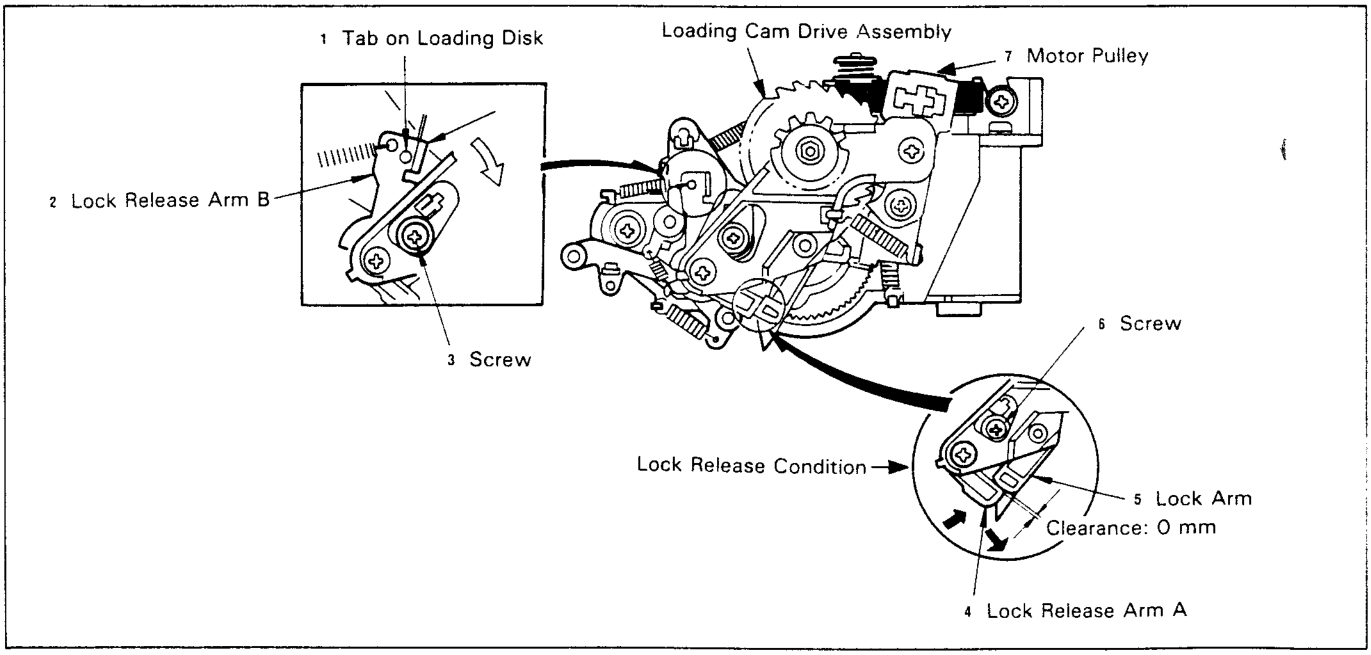

1 Tab on Loading Disk
Loading Cam Drive Assembly
7 Motor Pulley
2 Lock Release Arm B
3 Screw
6 Screw
Lock Release Condition
5 Lock Arm
Clearance: 0 mm
4 Lock Release Arm A

Fig. 19 Checking the Lock Release Arm A and B

(10) Reverse Prevention Pawl

If the reverse prevention pawl is not adjusted properly, reverse prevention of the loading disk will not function properly in any mode. (excluding the stop mode).

Checking (See Fig. 20)

1. Remove the take up reel table.
2. Set the VTR in the loading end state without cassette.
3. Set the VTR in any mode except the stop mode.
4. Make certain that reverse prevention pawl ② engages with ratchet ① properly.

Adjustment (See Fig. 20)

1. Loosen screw ③.
2. Set the VTR in the fast forward or rewind mode while pushing the loading disk counterclockwise.
3. By using a bladed screwdriver, move reverse prevention pawl ② until the clearance between reverse prevention pawl ② and ratchet ① is about 0.3 mm.
4. Tighten screw ③.
5. After replacement, repeat loading and unloading mode, and check that the loading disk turns smoothly.

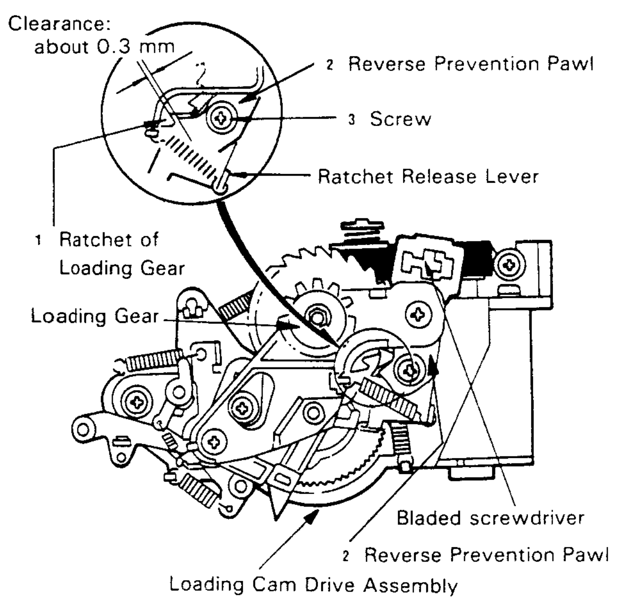

Clearance:
about 0.3 mm
2 Reverse Prevention Pawl
3 Screw
Ratchet Release Lever
1 Ratchet of Loading Gear
Loading Gear
Bladed screwdriver
2 Reverse Prevention Pawl
Loading Cam Drive Assembly

Fig. 20 Checking the Reverse Prevention Pawl

(11) Cam Switch Assembly (See Fig. 21)

Disassembly

1. Remove the loading cam drive assembly. [refer to Item (6)]
2. Insert a bladed screwdriver under cam switch ① and open three retainer pawls ③.
3. Pry cam switch ① with a bladed screwdriver for removal.

Assembly

1. Reverse steps 1 through 3 above.
2. After assembly, follow the steps as in Item (8), Item (9) and Item (10).

NOTE:

Positioning cam switch ① onto cam gear shaft ③, hole of cam switch ① should face in the direction of cam gear shaft ②.

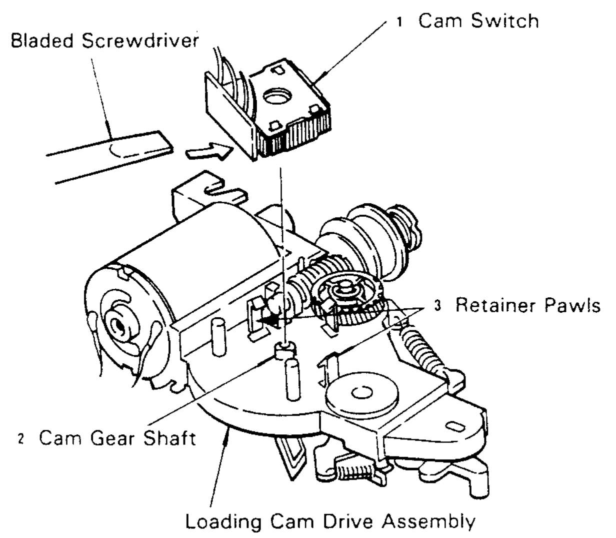

Bladed Screwdriver
1 Cam Switch
3 Retainer Pawls
2 Cam Gear Shaft
Loading Cam Drive Assembly

Fig. 21 Cam Switch Assembly

3-3-5. CASSETTE REFERENCE PLATE

Improper adjustment of the cassette reference plate causes the cassette to fit loosely. The result is that the tape cannot run smoothly. To prevent this problem, check as follows:

(1) Checking (See Fig. 22)

1. Remove the front loading assembly [refer to Section 3-4-2-(1)]
2. Place cassette reference plate ① in position on the reel drive chassis.
3. Check to insure that cassette reference plate ① cannot move up and down (↕), more than 0.1 mm.

(2) Adjustment (See Fig. 22)

If the cassette is too loose, adjust as follows:

1. Place the VTR on a level, sturdy bench.
2. Keeping cassette reference plate ① placed in position, loosen screw ③ holding cassette leveler lever ②.
3. Adjust cassette leveler lever ② until cassette reference plate ① is free of looseness.

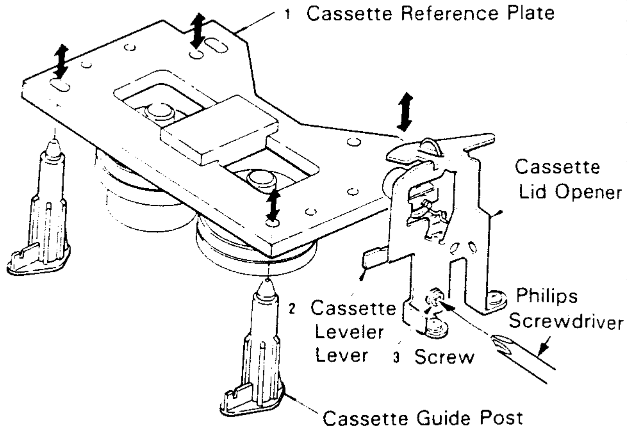

1 Cassette Reference Plate
Cassette Lid Opener
Philips Screwdriver
2 Cassette Leveler Lever
3 Screw
Cassette Guide Post

Fig. 22 Cassette Reference Plate

3-3-6. REEL TABLES

(1) Supply Reel Table (See Fig. 23)

Replacement

CAUTION:

In replacement, follow Item (3).

1. Remove the front loading assembly. [refer to Section 3-4-2-(1)]
2. Insert removal jig ① into reel table retainer ② and lift removal jig ① straight up with reel table retainers ② for removal.
3. Remove supply reel table ③.

NOTE:

As brake wheel ④ will be covered with oil, care must be taken as adjustment Reel Table Spacer ⑤ and washer ⑥ may be removed at the same time.

4. To reassemble, reverse steps 1 through 3.

CAUTION:

In positioning supply reel table ③, push supply brake lever ⑦ in arrow direction (↱) and insert it while turning counterclockwise. Care should be exercised to neither bend nor break the band brake.

5. Press reel table retainer ② into supply reel table ③ by finger and make sure that supply reel table can not be extracted.

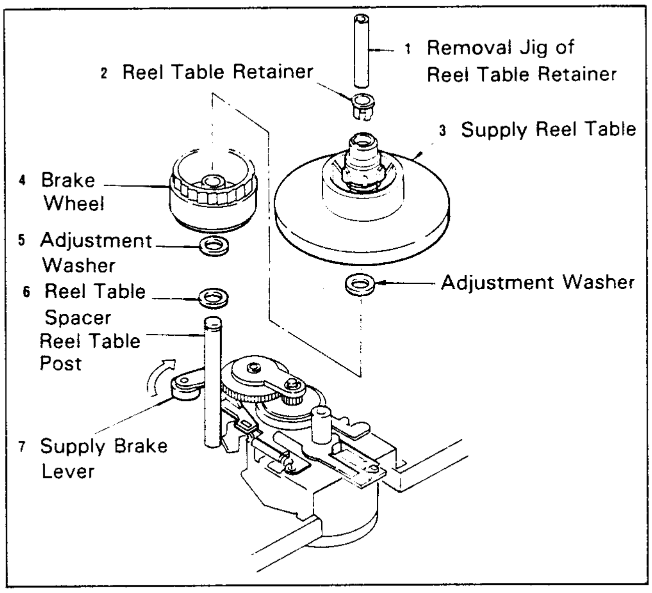

1 Removal Jig of Reel Table Retainer
2 Reel Table Retainer
3 Supply Reel Table
4 Brake Wheel
5 Adjustment Washer
6 Reel Table Spacer
Reel Table Post
Adjustment Washer
7 Supply Brake Lever

Fig. 23 Supply Reel Table Assembly

(2) Take Up Reel Table (See Fig. 24)

Replacement

CAUTION:

In replacement, follow Item (3).

1. Remove the front loading assembly. [refer to Section 3-4-2-(1)]
2. Insert removal jig ① into reel table retainer ② and lift removal jig ① straight up with reel table retainer ② for removal.
3. Remove take up reel table ③.

NOTE:

As bearing portion of take up reel table ③ will be covered with oil, care must be taken as adjustment washer ④ may be removed at the same time.

4. To reassemble, reverse steps 1 through 3.

CAUTION:

In positioning take up reel table ③, push take up brake lever ⑥ in arrow direction (↰) and insert it while turning lightly. Make sure the pawls of reel table pulley ⑤ are inserted into the holes of take up reel table ③.

5. Press reel table retainer ② into take up reel table ③ by finger and make sure that take up reel table is not extracted.

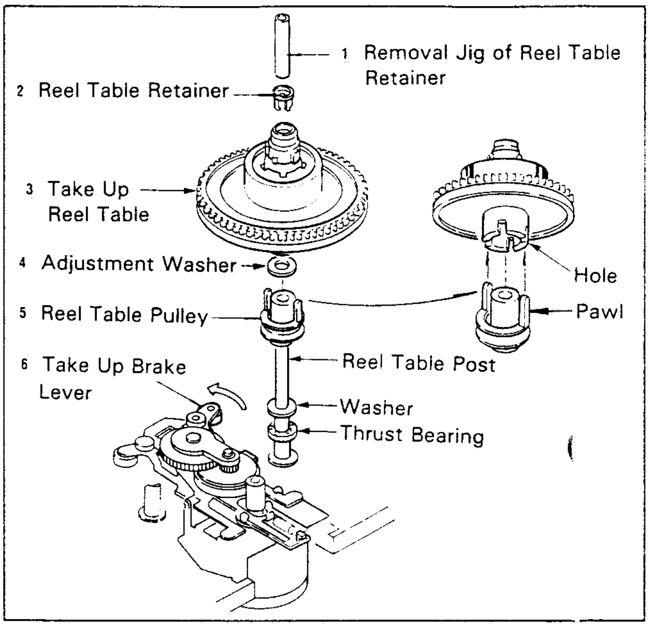

1 Removal Jig of Reel Table Retainer
2 Reel Table Retainer
3 Take Up Reel Table
4 Adjustment Washer
5 Reel Table Pulley
6 Take Up Brake Lever
Hole
Pawl
Reel Table Post
Washer
Thrust Bearing

Fig. 24 Take-Up Reel Table

3-3-7. EJECTION WINDING TORQUE

In cassette ejection, too weak tape winding torque can cause the cassette to fail to take up the tape. The result is that the tape could be damaged. To prevent such a failure, check as follows:

(1) Checking (See Fig. 25)

1. Remove the front loading assembly by following Section 3-4-2-(1).
2. Set the loading disk in the loading end state.
3. Put forward back tension measurement jig ② in position on take up reel table assembly ①.
4. Align tension gauge ③ so that the tape can be pulled.
5. Set up the VTR in the eject mode.
6. Read tension gauge ③ to make certain that the winding torque is larger than 60g cm.

NOTE:

The ejection winding torque is denoted by T

$T = Rt \times Rg$

Rt: tape radius (cm)

Rg: read of the tension gauge (g)

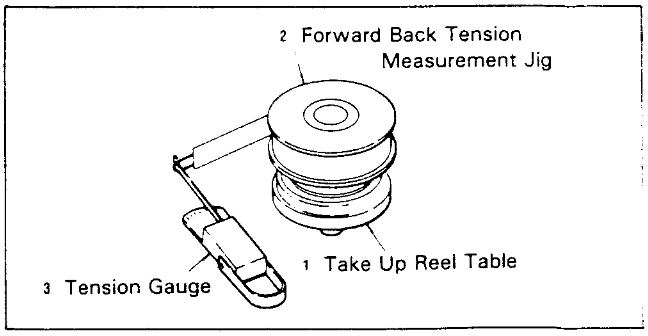

2 Forward Back Tension Measurement Jig
1 Take Up Reel Table
3 Tension Gauge

Fig. 25 Winding Torque Measurement at Eject Mode

(2) Adjustment

If the winding torque specified above cannot be obtained, proceed as follows:

1. Clean the rubber surface of idler wheel, pulley V groove, take up reel table assembly, and so on.
2. If the unloading roller is worn too much, replace it.

3-3-8. RECORDING AND PLAYBACK WINDING TORQUE AND THE ASSOCIATED COMPONENTS

In recording or playback, the tape fed out of the supply reel table is finally wound onto the take up reel table. Too large winding torque of the take up reel table can cause the tape to undergo excessively large tension, resulting in elongation of the tape. Too weak winding torque, on the other hand, results in no winding of the tape. To prevent such problems, check as follows:

(1) Checking (See Fig. 25)

1. Remove the front loading assembly. [refer to Section 4-2-(1)]
2. Set up the VTR in the loading end state.
3. Put forward back tension measurement jig 2 in position on take up reel table assembly 1 .
4. Hold the tape slack detection lever by hand to keep it from moving so the VTR does not reset from the playback mode.
5. Align tension gauge 3 so that the tape can be pulled.
6. Set up the VTR in the playback mode.
7. Move tension gauge 3 at approximately 20 mm/sec. toward tension measurement jig 2 , while the tape is would onto take up reel table 1 .
8. At the same time, read tension gauge 3 to make certain that the winding torque is in the range of 60 to 160 g.

NOTE:

The recording and playback winding torque is denoted by T

$T = Rt \times Rg$

Rt: tape radius (cm)

Rg: read of the tension gauge (g)

If the winding torque specified above can not be obtained, proceed as follows:

1. Check to insure that the idler spring is hooked properly and take up brake is not functioning.
2. Revolve the take up reel table assembly by hand to check that it can be revolved freely. If not, replace it by following Section 3-4-6.
3. Clean the rubber surface of idler wheel and reel motor pulley.
4. If the idler wheel and the reel motor pulley slip too much, replace them.

(2) Replacing the Reel Motor (See Fig. 26)

Disassembly

1. Remove the front loading assembly. [refer to Section 3-4-2-(1)]
2. Remove the supply reel table and the take up reel table. (refer to Section 3-4-6)
3. Remove the supply brake wheel.
4. Disconnect connector P611 8 from the servo • logic • audio circuit board.
5. Remove screws 6 and lift reel drive assembly straight up for removal.

NOTE:

To avoid damage of band brake assembly, be sure to remove sliding guide beforehand.

6. Remove E ring 1 , idler clutch assembly 3 , idler wheel gear assembly 4 and idler holder 2 .
7. Remove screws 5 and reel motor assembly 7 .
8. Loosen screw 11 holding shield plate and remove lead wires (red) and (white) 9 from the motor terminal to pull shield plate assembly 10 out of motor body.
9. Replace reel motor.

Assembly

1. Reverse steps 1 through 9 above.

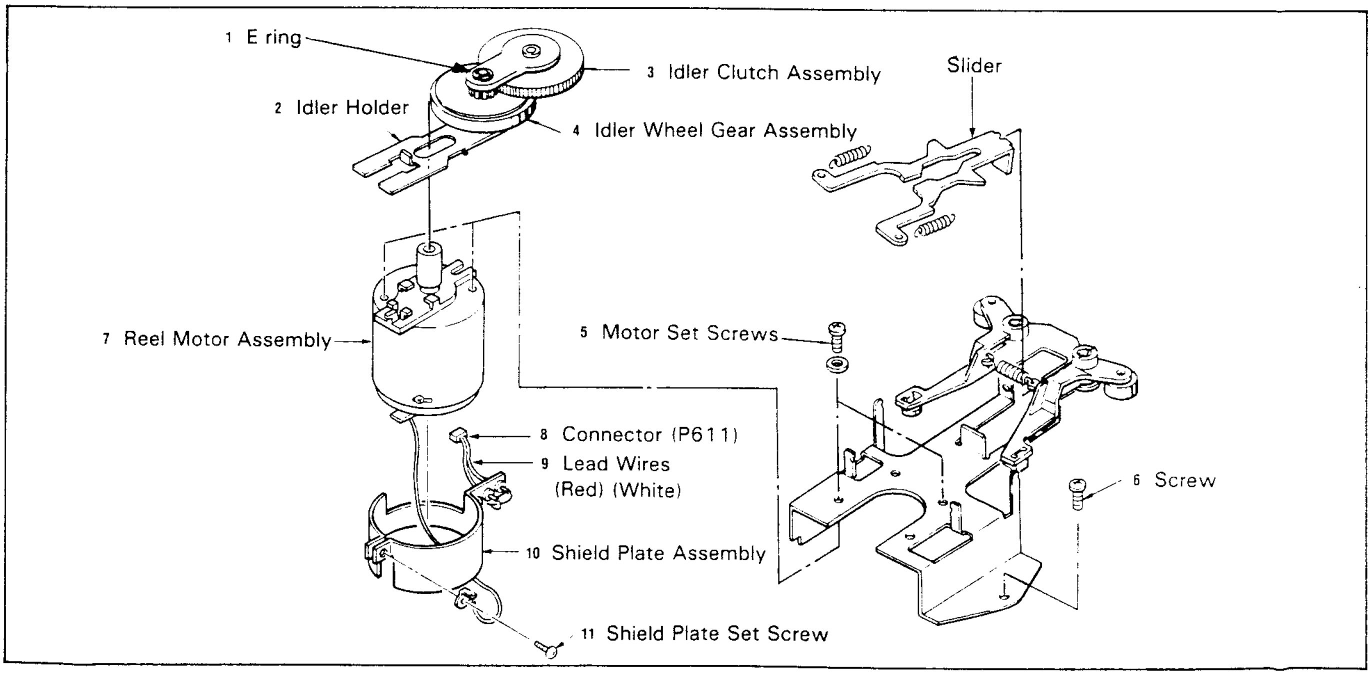


Fig. 26 Reel Motor Assembly

(3) Replacing the Idler Gear (See Fig. 27)

Disassembly

1. Remove the front loading assembly. [refer to Section 3-4-2-(1)]
2. Remove E ring ①.
3. Remove idler holder assembly ②.
   (Be careful not to remove polyethylene slider ⑥ along with it.)
4. Remove polyethylene sliders ④ and spring ⑤.
5. Replace idler gear ③.

Assembly

Reverse steps 1 through 5 above.

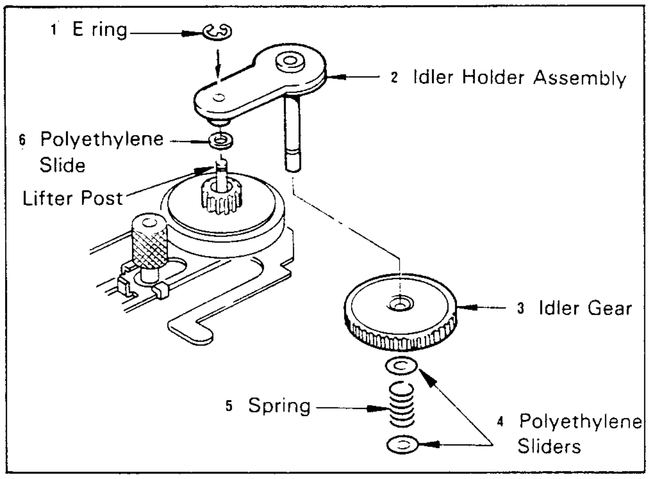


Fig. 27 Ider Gear

(4) Replacing the Idler Wheel (See Fig. 28)

Disassembly

1. Remove the front loading.
   [refer to Section 3-4-2-(1)]
2. Remove E ring ①.
3. Remove idler holder assembly ②.
4. Remove polyethylene slider ③.
5. Replace idler wheel ④.

Assembly

Reverse steps 1 through 5 above.

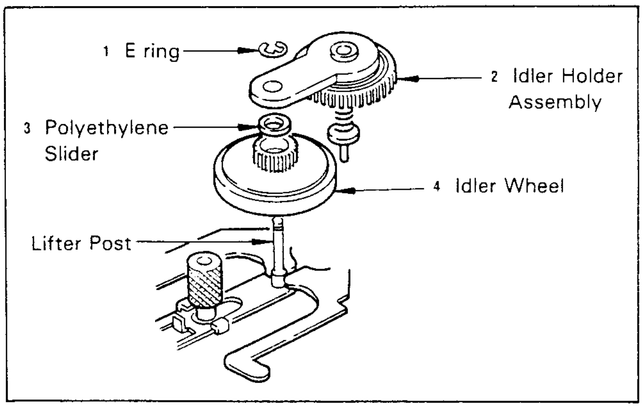


Fig. 28 Ider Wheel

3-3-9. FAST FORWARD WINDING TORQUE

In the fast forward mode, the tape fed out from the supply reel table is wound into the take up reel table. If the winding torque is too weak, the tape cannot fully wind. To prevent such a failure, check as follows:

(1) Checking (See Fig. 29)

1. Remove the front loading assembly.
   [refer to Section 3-4-2-(1)]
2. Set up the VTR in the loading end state.
3. Put forward back tension measurement jig ② in position on take up reel table assembly ①.
4. Align tension gauge ③ so that the tape can be pulled.
5. Set up the VTR in the fast forward mode.
6. Holding tension gauge ③ with the tape stretched, read tension gauge ③. The winding torque should be more than 750g cm.

NOTE:

The fast forward winding torque is denoted by T
T = Rt × Rg
Rt: tape radius (cm)
Rg: read of the tension gauge (g)

If the winding torque specified above can not be obtained, proceed as follows:

1. Clean th idler surface of take up reel table assembly, rubber surface of idler wheel and reel motor pulley.
2. If they are worn too much, replace them.

3-3-10. THE REWINDING TORQUE

In the rewinding mode, the tape is rewound from the take up reel onto the supply reel table. Too weak rewinding torque of the supply reel table can not fully rewind the tape. To prevent such a failure, check as follows:
Proceed in the same way as in Section 3-4-9 the FAST FORWARD WINDING TORQUE except place the measurement jig on the supply reel table.

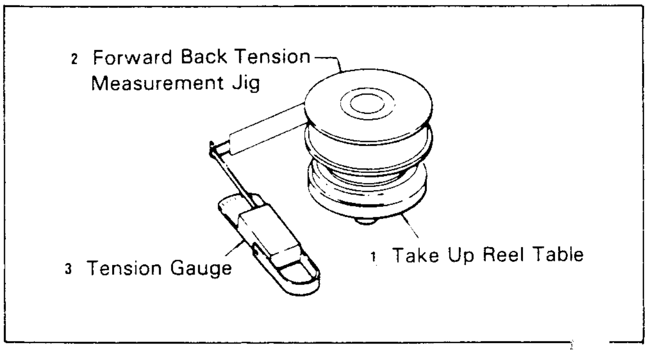


Fig. 29 Fast-Forward Winding torque Measurement

3-3-11. THE SUPPLY BRAKE TORQUE (MAIN BRAKE TORQUE)

Too weak supply brake torque can result in excessive slack of tape at the end of the fast forward or rewinding mode. Also, the tape is pulled out from the cassette even in no operation. To prevent such failures, proceed as follows:

(1) Checking (See Fig. 30)

1. Remove the front loading assembly.
   [refer to Section 3-4-2-(1)]
2. Turn supply reel table ① several times clockwise by hand for aging.
3. Put forward back tension measurement jig ② in position on supply reel table assembly ①.
4. Read tension guage ③, while stretching the tape at an approximate speed of 20 mm/sec. by tension gauge ③. The supply brake torque should be more than 90g cm.

NOTE:

The supply brake torque is denoted by T

$T = Rt \times Rg$

Rt: tape radius (cm)

Rg: read of the tension gauge (g)

If the winding torque specified above cannot be obtained, proceed as follows:

1. Clean the braking surface of the supply reel table.
2. Replace the pause lever roller. (refer to Section 3-4-13)

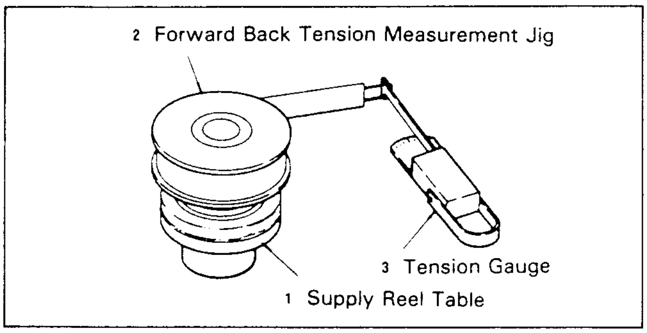


Fig. 30 Supply Brake Torque Measurement

3-3-12. THE TAKE-UP BRAKE TORQUE (MAIN BRAKE TORQUE)

Too weak take up brake torque can result in excessive slack of tape at the end of the fast-forward or rewinding mode. Also, the tape is pulled out from the cassette even in no operation. To prevent such failures, proceed as follows:

(1) Checking (See Fig. 29)

1. Remove the front loading assembly. [refer to Section 3-4-2-(1)]
2. Turn the take-up reel table assembly several times counterclockwise by hand for aging.
3. Put forward back-tension measurement jig ② in position on take-up reel table assembly ①.
4. Read tension gauge ③, while stretching the tape at an approximate speed of 20 mm/sec. by tension gauge ③. The take-up brake torque should be more than 90g cm.

NOTE:

The take-up brake torque is denoted by T

$T = Rt \times Rg$

Rt: tape radius (cm)

Rg: read of the tension gauge (g)

If the winding torque specified above cannot be obtained, proceed as follows:

1. Clean the braking surface of the supply reel table.
2. Replace the pause lever roller. (refer to Section 3-4-13)

3-3-13. PAUSE LEVER ROLLER (See Fig. 31)

(1) Disassembly

1. Remove the front loading assembly. [refer to Section 3-4-2-(1)]
2. Remove the supply reel table and take-up reel table. (refer to Section 3-4-6)
3. Remove E ring ①.
4. Remove idler holder assembly ②.
5. Remove spring ③.
6. Remove supply brake lever ④ and replace pause lever roller ⑤.
7. Remove take-up brake lever ⑥ and replace pause lever roller ⑦.

(2) Assembly

1. Reverse steps 1 through 7 above.
2. Make certain that spring ③ is hooked properly and brake lever rollers ⑧ are installed correctly.

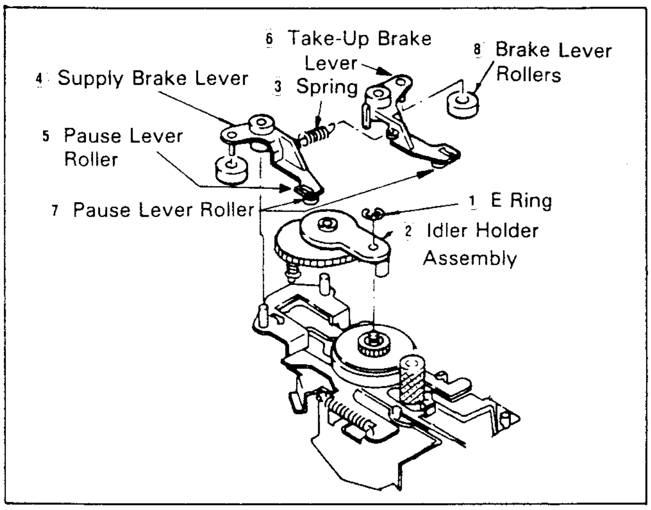


Fig. 31 Pause Brake Lever

3-3-14. REWIND BRAKE TORQUE

The rewind brake torque refers to the brake torque of the take-up reel table in the rewinding or R-Search mode. Improper rewind brake torque results in not being able to rewind the tape or stop rewinding. It can also result in improper winding torque in the recording or playback mode. This leads to abnormal tape running and to wrong tape counter operation. To prevent such problems, proceed as follows:

(1) Checking (See Fig. 32)

1. Remove the front loading assembly. [refer to Section 3-4-2-(1)]
2. Put forward back-tension measurement jig ② in position on take-up reel table assembly ①.
3. Set up the VTR in the rewinding or R-Search mode.
4. Read tension gauge ③, while pulling the tape at an approximate speed of 20 mm/sec. by tension gauge ③. The rewind brake torque should be less than 20g cm.

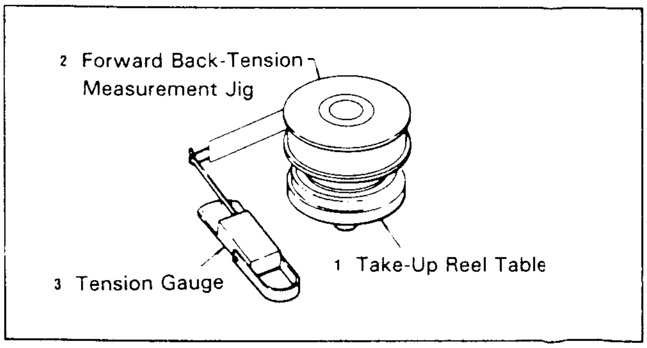


Fig. 32 Take-Up Brake Torque Measurement

If the measured rewind brake torque is larger than the value specified above, proceed as follows:

1. Check to insure that the counter belt has not slipped off the reel table pulley and counter pulley and are not touching any wire or other parts.
2. Revolve take-up reel table assembly ① by hand to check that the counter operates normally.
3. Remove counter belt.
4. Set up the VTR in the rewinding mode.
5. Revolve take-up reel table assembly ① and check that this can be revolved freely. If not, replace it (refer to Section 3-4-6)
6. If counter belt is elongated or worn too much, then replace it. (refer to Section 3-4-15)

NOTE:

The Rewind brake torque is denoted by T
$T = Rt \times Rg$
Rt: tape radius (cm)
Rg: read of the tension gauge (g)

3-3-15. COUNTER BELTS

(1) Disassembly (See Fig. 33)

1. Remove the front loading assembly. [refer to Section 3-4-2-(1)]
2. Remove the take-up reel table. [refer to Section 4-6]
3. Replace counter belt.

(2) Assembly

1. Reverse steps 1 through 3 above.
2. Make sure that the counter operates normally.

CAUTIONS:

1. Do not touch the counter belts with greasy hands.
2. In installation, care should be observed to not cross nor twist the counter belt.

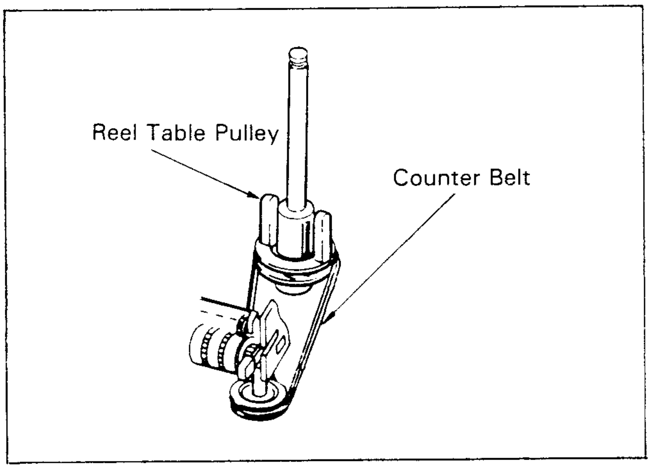

Reel Table Pulley
Counter Belt

Fig. 33 Counter Belt

3-3-16. PINCH LOCK ASSEMBLY

(1) Checking (See Figs. 34, 35)

1. Make sure that pinch lock lever ① is engaged with cam link ③ properly. (See part A of Fig. 34)
2. Make sure that pinch lock spring ② is hooked in correct condition. (See part B of Fig. 34)
3. Set the VTR in the stop condition.
4. Make sure that cam link ③ is engaged with cam arm ④. (See part C of Fig. 35)
5. Make sure that rod ⑥ of band brake assembly ⑤ is positioned above cam link ③.
(See part D of Fig. 35)
6. Make sure that the roller of tension sub-lever ⑦ is in correct position. (See part E of Fig. 35)
7. Make sure that soft brake lever ⑧ does not touch with cam link ③. (See part F of Fig. 35)

NOTE:

Clearance is needed between cam link ③ and soft brake lever ⑧.

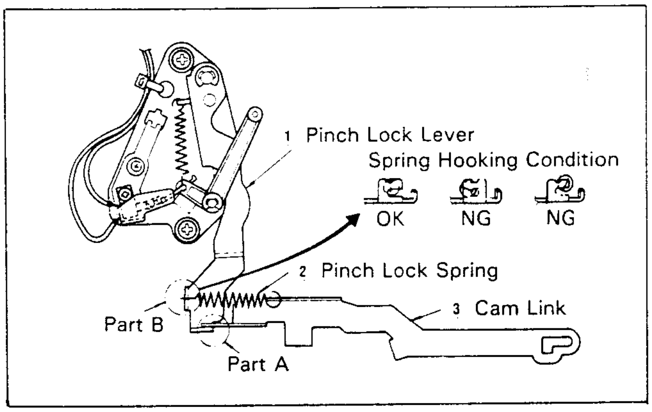

1 Pinch Lock Lever
Spring Hooking Condition
OK
NG
NG
2 Pinch Lock Spring
3 Cam Link
Part B
Part A

Fig. 34 Pinch Lock Lever and Cam Link

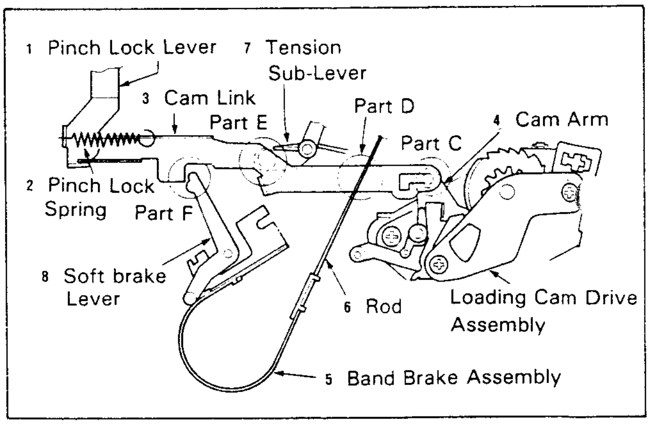

1 Pinch Lock Lever
7 Tension Sub-Lever
3 Cam Link
Part E
Part D
4 Cam Arm
Part C
2 Pinch Lock Spring
Part F
8 Soft brake Lever
6 Rod
Loading Cam Drive Assembly
5 Band Brake Assembly

Fig. 35 Positioning the Cam Link

3-3-17. SLACK DETECTOR POSITION (See Fig. 36)

If the leaf switch position is not adjusted properly or the switch lever is deformed, the auto-stop may function even when the tape is running in normal condition in the recording and playback mode or the auto-stop may not function even when the tape is slackened, resulting in trouble such as the tape's catching the capstan or pinch roller. Therefore, it is necessary to check the slack detector position.

1. Run the tape in the playback mode.
2. Push slack lever ① lightly by hand and move it gradually towards loading disk slack lever stopper ④.
3. Make certain that the auto-stop functions when slack lever pole 2 is positioned at a distance of 1.5 to 3 mm from loading disk slack lever stopper 4.

3-3-18. LEAF SWITCH POSITION (See Fig. 36)

1. Set the VCR in the loading end state without cassette tape.
2. Loosen screw ⑤ holding leaf switch bracket ⑥.
3. Turn leaf switch bracket ⑥ in arrow direction (↷) until it stops at the guide hole of leaf switch ③.
4. Set the VTR in the playback mode. The auto-stop will not function at this time. If it functions, leaf switch may be defective (the lever is deformed) or wiring may be improper.
5. Insert a spacer of 2 mm thick into the space between slack lever pole ② and loading disk slack lever stopper ④.
6. Gradually move leaf switch ③ in arrow direction (↶) for adjustment and tighten set screw ⑤ at the position where the auto-stop functions.

In case adjustment cannot be made sufficiently-in case auto-stop does not function even, after leaf switch is adjusted:

1. If leaf switch lever is deformed and contact points do not touch each other, or if the switch is turned on too quickly, replace the leaf switch.
2. If the switch does not function even when its contact points are turned on, the following causes may be suspected.
   A) Faulty contact of leaf switch.
   B) Faulty wiring and circuit.
   For A), replace leaf switch.

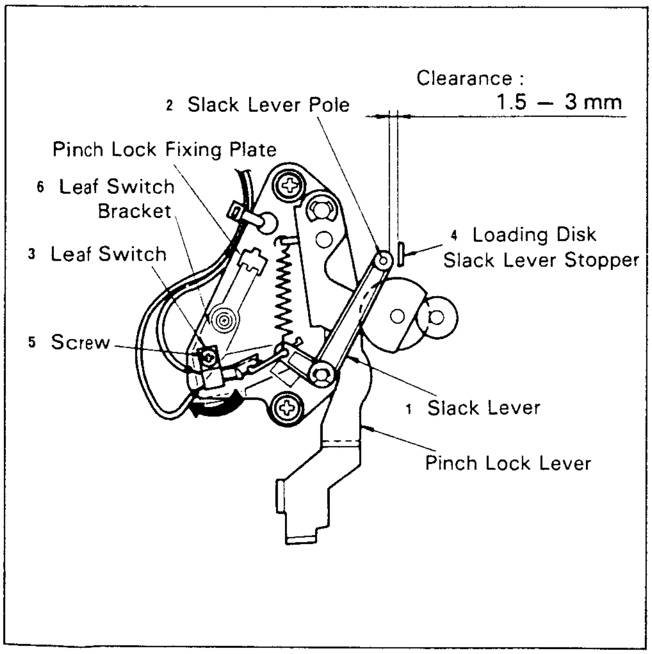


Fig. 36 Positioning the Slack Detector

3-3-19. THE TENSION SERVO MECHANISM

(1) The Tension Lever (See Fig. 37)

Checking

If the tension lever is not in position at the end of unloading, the tension lever is bent or tape slides off the tension lever. To prevent such problems, check as follows:

1. Remove the front loading assembly. [refer to Section 3-4-2-(1)]
2. Press the EJECT button to set loading disk.
3. Make certain that the clearance between 2nd guide pole ② and tension arm ① is between 0.5 to 1.5 mm.

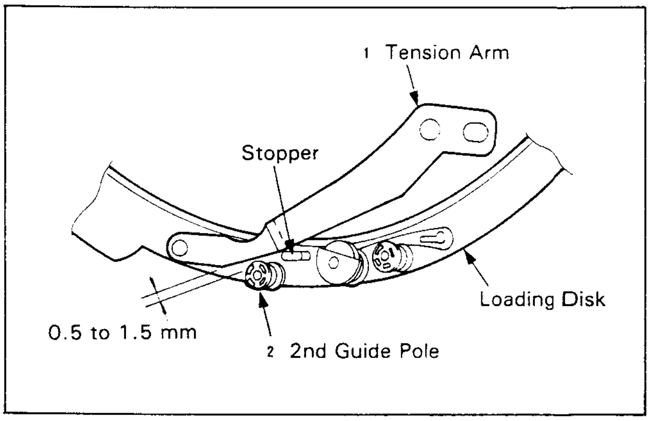


Fig. 37 Positioning the Tension Arm

(2) The Tension Servo Mechanism Operation in Tape Loading (See Fig. 38)

Checking

1. Remove the front loading assembly. [refer to Section 3-4-2-(1)]
2. Set the VTR in fully loaded mode.
3. Make certain that arm shift lever ② touches the bent portion of tension arm ① and tension arm ① does not move counterclockwise.

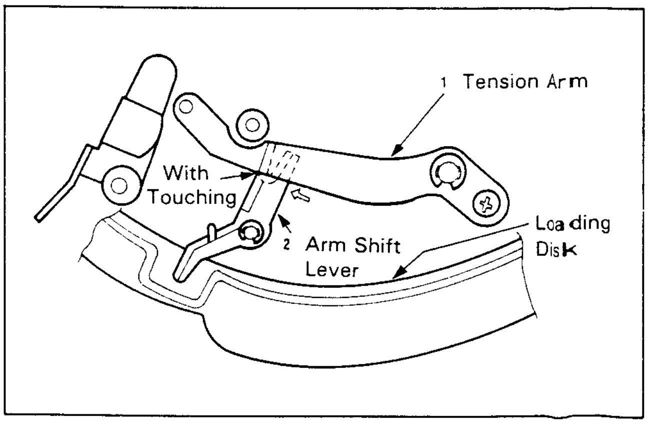


Fig. 38 Tension Servo Mechanism

(3) Band Brake Assembly

Checking (See Fig. 39)

1. Remove the front loading assembly. [refer to Section 3-4-2-(1)]
2. Set the VTR in fully loaded state without cassette tape.
3. Set the VTR in the playback mode.
4. Make certain that the clearance A between tension arm ① and entrance guide post ② is in range of 1.0 to 1.5 mm.

Adjustment (See Fig. 39)

If the clearance is not in the specified range, proceed as follows:

1. Remove the front loading assembly. [refer to Section 3-4-2-(1)]
2. Set the VTR in fully loaded condition without cassette tape.
3. Set the VTR in the playback mode while holding the slack lever by hand.
4. Loosen screw ③ holding band brake bracket ④.
5. Put a bladed screwdriver into groove ⑤ of band brake bracket ④.
6. Move band brake bracket ④ in arrow directions (↗) until the clearance A between tension arm ① and entrance guide post ② is in range of 1.0 to 1.5 mm.
7. Tighten screw ③.
8. Make certain that there is always a clearance B between tension lever ⑧ and tension sub-arm ⑦ when supply reel table ⑥ is turned clockwise (↻) by hand. If tension lever ⑧ touches tension sub-arm ⑦, adjust clearance A again.
9. Repeat the playback and stop mode, then, check clearance A again.
10. Revolve supply reel table ⑥ clockwise by hand and make certain that tension arm ① does not touch tension sub-arm ⑦.

Replacement (See Fig. 40)

1. Set the VTR in fully unloaded condition.
2. Remove the front loading assembly. [refer to Section 3-4-2-(1)]
3. Remove supply reel table stopper ⑥, supply reel table ⑤ washer ⑫ and brake wheel ② (refer to Section 3-4-6)
4. Remove the detect assembly. (See Fig. 17)
5. Remove E ring ⑨, washer ⑦, soft brake spring ⑩ and soft brake lever ⑧.
6. Remove screw ⑪ and unhook the bent portion of brake rod ④ from tension lever ①.
7. Replace band brake assembly ③.
8. To reassemble, reverse steps 1 through 7.

NOTES:

1. Before installing the front loading assembly, follow the band brake adjustment procedure.
2. When installing band brake assembly ③, insert part A of the reel drive chassis into the slit of band brake assembly ③.

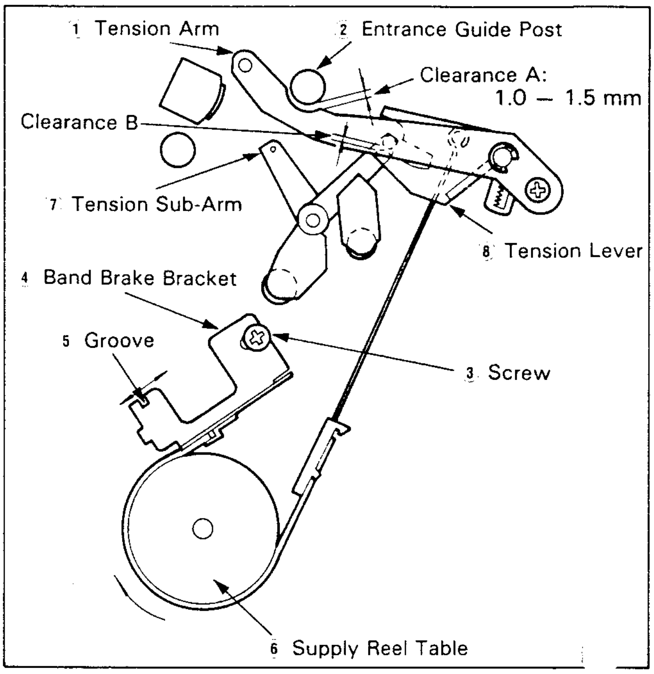

① Tension Arm
② Entrance Guide Post
Clearance A:
1.0 — 1.5 mm
Clearance B
⑦ Tension Sub-Arm
⑧ Tension Lever
④ Band Brake Bracket
⑤ Groove
③ Screw
⑥ Supply Reel Table

Fig. 39 Positioning the Band Brake Assembly

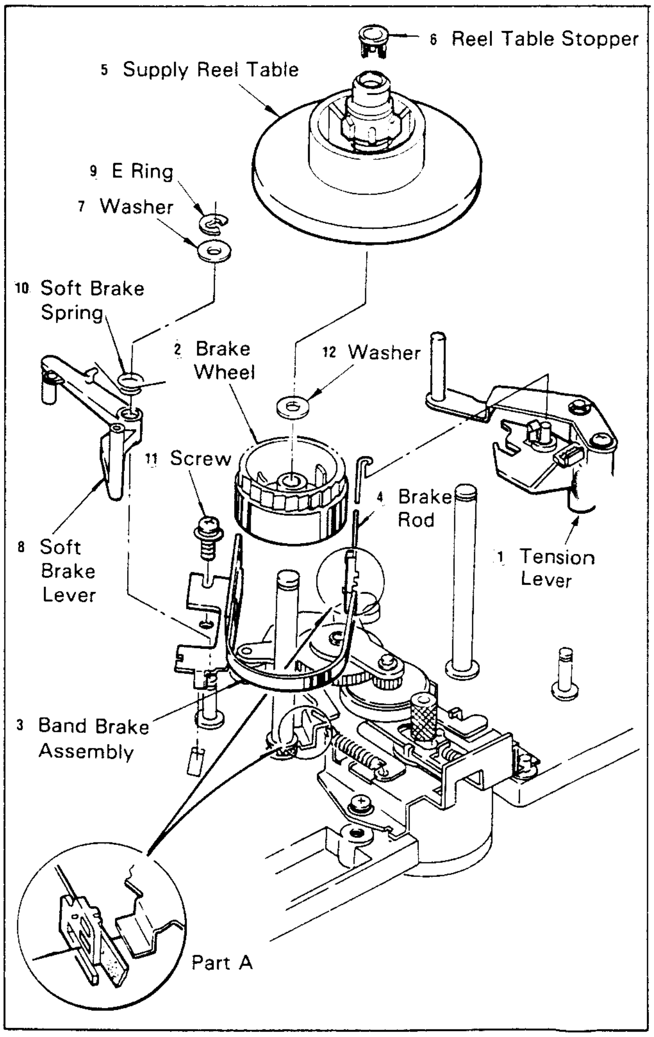

⑥ Reel Table Stopper
⑤ Supply Reel Table
⑨ E Ring
⑦ Washer
⑩ Soft Brake Spring
② Brake Wheel
⑫ Washer
⑪ Screw
④ Brake Rod
⑧ Soft Brake Lever
① Tension Lever
③ Band Brake Assembly
Part A

Fig. 40 Replacing the Band Brake Assembly

(4) Tension Arm Assembly (See Fig. 41)

Disassembly

1. Set the VTR in fully unloaded condition.
2. Set the power switch to off.
3. Remove screws ① holding tape retainer ②.
4. Remove tape retainer ②.
5. Remove E ring ③ and screw ④.
6. Remove tension arm assembly ⑤.

Assembly

1. Reverse steps 1 through 6 above.

NOTE:
Before tightening screw ④, remove any metal particles caught in the head of it.

2. After assembly, check vertical angle of the tension pole. (refer to Section 3-4-23)

(5) Tension Lever (See Fig. 41)

Disassembly

1. Remove tension arm assembly ⑤ by following Item (4) above.
2. Unhook rod ⑥ of the band brake assembly and tension spring ⑦ from tension lever ⑧.
3. Remove tension lever ⑧.

Assembly

1. Reverse steps 1 through 3 above.
2. After assembly, check vertical angle of the tension pole (refer to Section 3-4-23) and the back tension in playback mode. [refer to Section (7)]

(6) Tension Sub-Arm (See Fig. 41)

Disassembly

1. Set the VTR in fully unloaded condition.
2. Set the power switch to off.
3. Remove the front loading assembly. [refer to Section 3-4-2-(1)]
4. Remove the pinch lock assembly and loading disk. [refer to Section 3-4-4-(7)]
5. Remove the cam link.
6. Remove E ring ⑨, polyethylene washer ⑩, spring ⑪ and arm shift lever ⑫.
7. Remove tension sub-arm ⑬.

Assembly

1. Reverse steps 1 through 7 above.
2. After assembly, adjust the pinch lock assembly and the loading cam drive assembly, and check the tension servo operation in tape loading. [refer to Section 3-4-19-(2)]

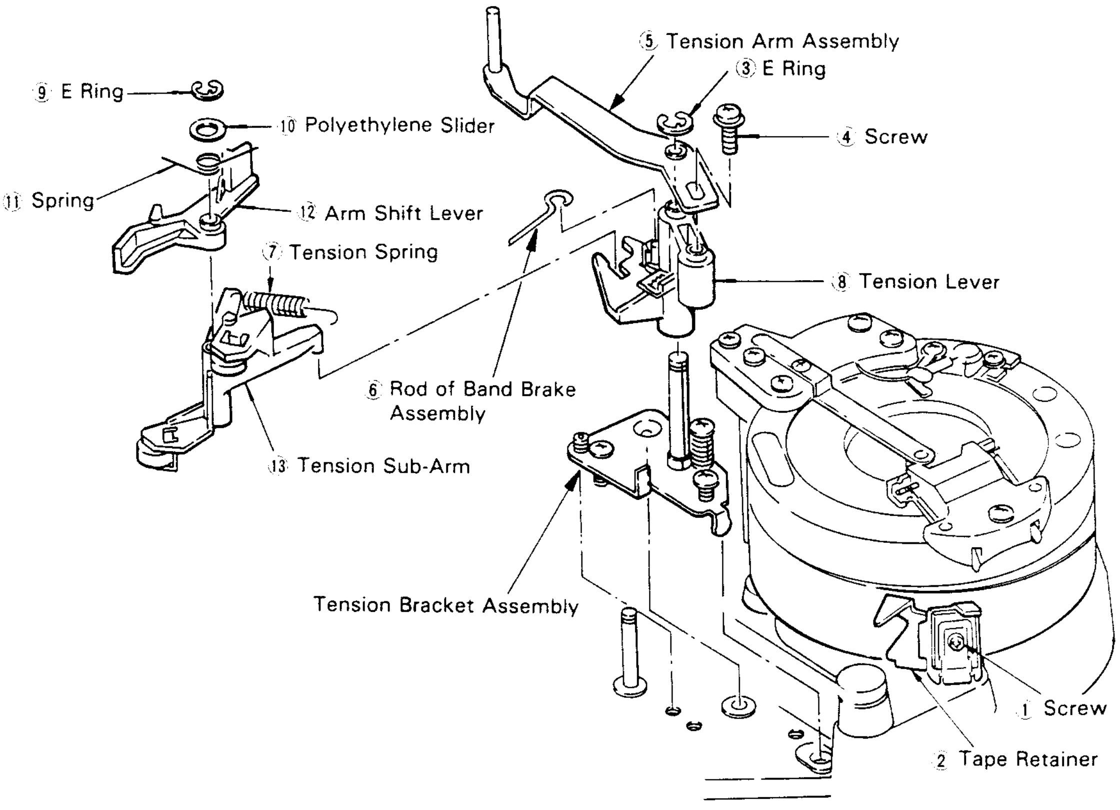

⑤ Tension Arm Assembly
③ E Ring
④ Screw
⑨ E Ring
⑩ Polyethylene Slider
⑪ Spring
⑫ Arm Shift Lever
⑦ Tension Spring
⑧ Tension Lever
⑥ Rod of Band Brake Assembly
⑬ Tension Sub-Arm
Tension Bracket Assembly
① Screw
② Tape Retainer

Fig. 41 Replacing the Tension Arm Assembly

(7) Back Tension in Recording and Playback Mode (Fig. 42)

1. Remove the top cover.
2. Remove FL drive assembly ② from front loading assembly ①. (See Fig. 44)
3. Remove the cassette lid opener, and mount back-tension bracket ④ in the place where the cassette lid was positioned, and mount forward tension gauge ⑤.
4. Load back tension measuring tape ⑤, wind it around No. 1 guide ①, tension pole ②, and roller ③ of forward tension gauge ⑦.
5. Push the playback button to play and measure tension.
6. Lock the slack switch.
7. When the slack switch has operated press the playback button.
8. While the tape is being pulled out at a speed of about 20 mm/second, measure the back tension with tension gauge ⑥, and check if it is between 47 and 57 grams.

NOTE:

The tape is tilted about 20° upward on the roller of forward tension gauge ⑦.

Be careful against too small or too large a tape pulling angle because it changes back tension value.

If back tension does not meet the specified value:

1. Change the position wheere the tension spring is hooked.
   a. Back tension can be increased by shifting the tension spring in direction A.
   b. Back tension can be decreased by shifting the tension spring in direction B.
2. If the back tension differs more than 10 grams between the beginning and end of the tape, or if it varies so much, replace the band brake.
3. If the band brake is seriously damaged when replacing the reel base or the like, replace the brake.

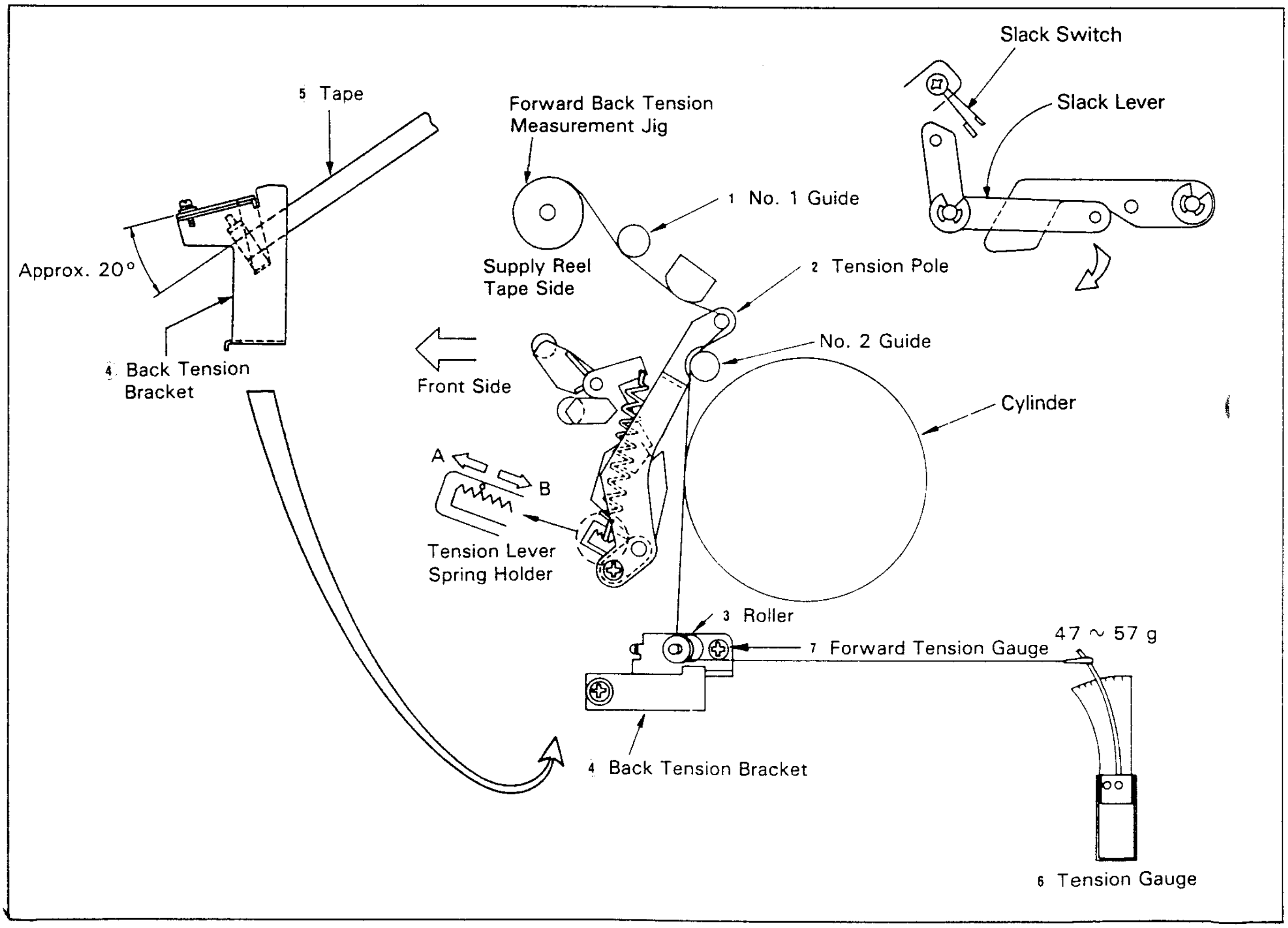

5 Tape
Approx. 20°
4 Back Tension Bracket
Forward Back Tension Measurement Jig
Supply Reel Tape Side
Front Side
A
B
Tension Lever Spring Holder
1 No. 1 Guide
2 Tension Pole
No. 2 Guide
Cylinder
Slack Switch
Slack Lever
3 Roller
7 Forward Tension Gauge
47 ~ 57 g
4 Back Tension Bracket
6 Tension Gauge

Fig. 42 Back Tension Check (Top View)

3-3-20. CYLINDER ASSEMBLY

(1) Tape Retainer Spring

Checking

The tape retainer spring causes the tape to move along the tape guide post of the lower cylinder, and makes the tape run smoothly. If the tape retainer spring is deformed too much or its pressure is too low, the envelope waveform cannot be normal. Replace the tape retainer spring assembly by following the steps below.

Replacement (See Fig. 43)

1. Remove the top cover. (refer to Section 3-4-1)
2. Remove screw ① holding tape retainer spring assembly ②.
3. Replace tape retainer spring assembly 2 by reversing steps 1 and 2.

NOTE:

In installation, fully press tape retainer spring assembly 2 in arrow (↖) direction.

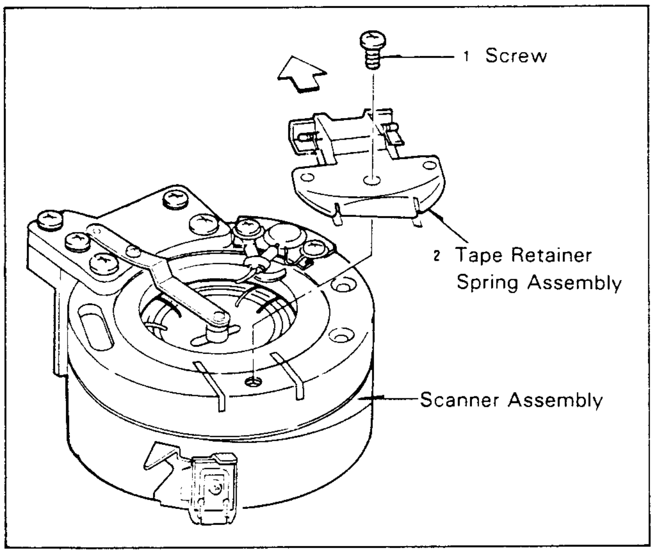


Fig. 43 Tape Retainer Spring Assembly

(2) Earthing Brush and Cap Assembly (See Fig. 44)

If the brush and cap are not touching, picture quality may not be normal. Replace the earthing brush spring assembly by following the stops below.

Disassembly

1. Remove screw 1 from bracket 4 and remove brush spring assembly 2.
2. Remove cap assembly 3 by pushing it upward with bladed screwdriver.

Assembly

To reassemble, reverse steps 1 through 2.

Checking After Replacement

Playback the monoscope section of the alignment tape and observe the picture on the monitor TV and check that it is normal.

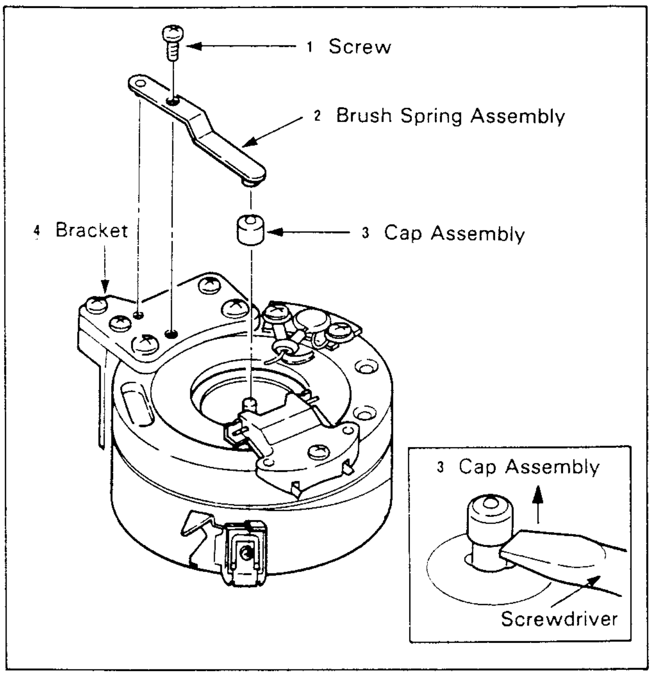


Fig. 44 Earthing Brush and Cap Assembly

(3) Dew Heater (Fig. 45)

The dew heater warms up the cylinder to eliminate dew condensation and to prevent the tape from sticking to the cylinder. The dew heater is powered on or off according to table 1.

Operating Condition		Power
Timer (ON)	Cylinder Working mode	ON
Timer (STAND BY)	Cylinder Stopping mode	OFF
Power Switch (OFF)	Cylinder Stopping mode	ON
Power Switch (ON)	Cylinder Working mode	OFF
	Cylinder Stopping mode	ON

Table 1

Checking

1. Check to insure that the power is supplied to the VTR.
2. Turn the set on, and put the VTR in the stop mode.
3. Wait 4 to 5 seconds, touch the dew heater with the finger and make certain that the dew heater is on.

Adjustment

1. If the dew heater is not turned on, check whether power is supplied to it.
2. If it is, the dew heater is defective. Replace it by following the steps below.

Replacement (See Fig. 45)

1. Remove the upper cover. (refer to Section 3-4-1)
2. Unsolder lead wire ③ after releasing it from lead clamper ②.
3. Remove two screws ⑤ holding dew heater ① to upper scanner ⑦.
4. Replace dew heater ①.
5. Tighten one of screws ⑤ to hold dew heater ① with lead wire ④.
6. Tighten the other screw ⑤.
7. Solder lead wire ③.

NOTE:

When using the battery pack, dew heater will not be powered on.

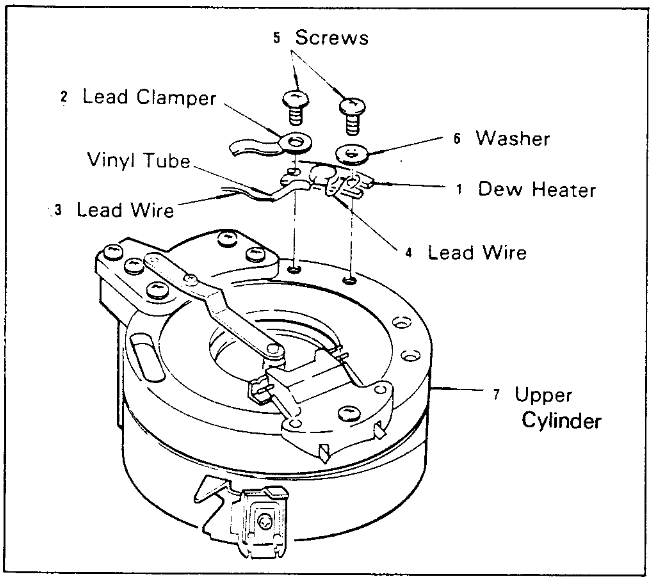

5 Screws
2 Lead Clamper
Vinyl Tube
3 Lead Wire
6 Washer
1 Dew Heater
4 Lead Wire
7 Upper Cylinder

Fig. 45 Replacement of Dew Heater

(4) Cylinder Motor

The cylinder motor revolves the video head assembly. In playback mode, it is controlled at a constant speed of 1800 rpm by the servo-circuit.

Checking

1. If the motor does not revolve, first check the electrical wiring.
2. Apply power to the cylinder motor directly. (12 volts)
3. If it does revolve, the cylinder motor is defective. Replace the rotor or stator by following the steps below:

(5) Replacing the Rotor or Stator of Cylinder Motor (See Figs. 46, 47)

To replace the rotor, proceed as follows:

1. Remove the cabinet by following Section 3-4-1.
2. Open the servo logic circuit board and video, audio circuit board.
3. Loosen two screws ⑥ holding rotor ⑤.
4. Lift rotor ⑤ straight up for removal.
5. Replace by reversing steps 1 through 4.

CAUTION:

Two screws ⑥ should be torqued 12 kg-cm, approximately.

To replace the stator, proceed as follows:

1. Follow steps 1 through 4 above.
2. Remove 3P connector ① by using tweezers ②. (See Fig. 46)
3. Remove two screws ④ holding stator ③ to the lower scanner assembly.
4. Lift stator ③ upward.
5. Replace the stator by reversing steps 1 through 4.

NOTE:

When installing stator ③ into shield case assembly ①, 3P connector ② should face to the hole of shield case assembly ①.

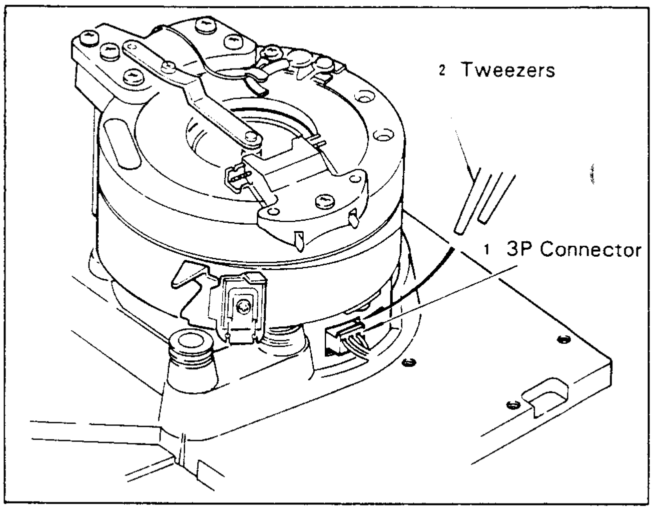

2 Tweezers
1 3P Connector

Fig. 46 Replacing the Cylinder Motor

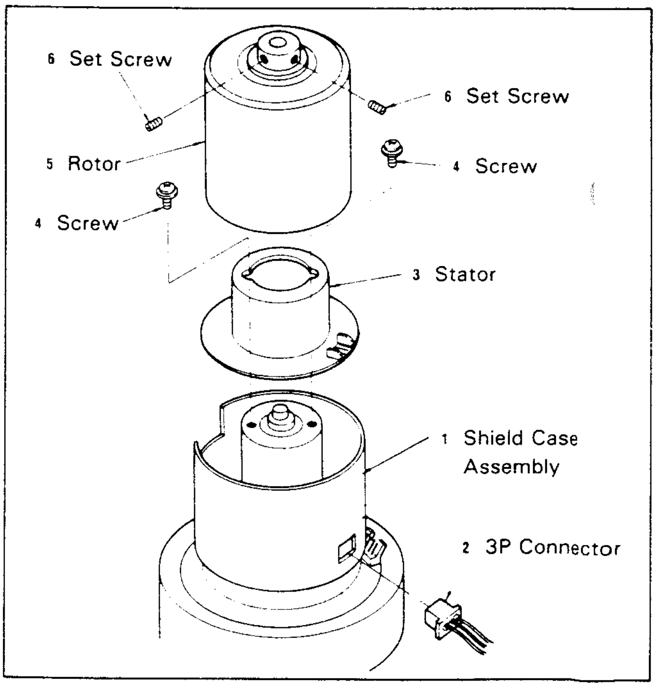

6 Set Screw
6 Set Screw
5 Rotor
4 Screw
4 Screw
3 Stator
1 Shield Case Assembly
2 3P Connector

Fig. 47 Replacing the Rotor and Stator

(6) Upper Cylinder (See Fig. 48)

Check the upper cylinder for scratches, abrasion, and other defects. If any, replace as follows:

Replacement

1. Remove the upper cover. (refer to Section 3-4-1)
2. Remove tape retainer spring assembly ① and dew heater ② mounted on upper cylinder ③.
3. Remove three screws ⑥ holding upper cylinder ③.
4. Lift upper cylinder ③ straight up for removal.
5. Remove two screws ⑤ and replace upper cylinder ③.
6. Put upper cylinder ③ in position.
7. Temporarily tighten three screws ⑥ to hold upper cylinder ③ to connector ④.
8. While pressing upper cylinder ③ in arrow direction (↖), firmly tighten three screws ⑥.
9. Put tape retainer spring ① and dew heater ② in position. Clamp lead wire ⑧ by lead clamper ⑦ to prevent slack of the lead wire ⑧.

Checking After Replacement

1. Playback the monoscope section of the alignment tape and observe the envelope waveform on the oscilloscope.
2. If the envelope waveform is not normal, follow the tape path adjustment as directed in Section 3-4-23.

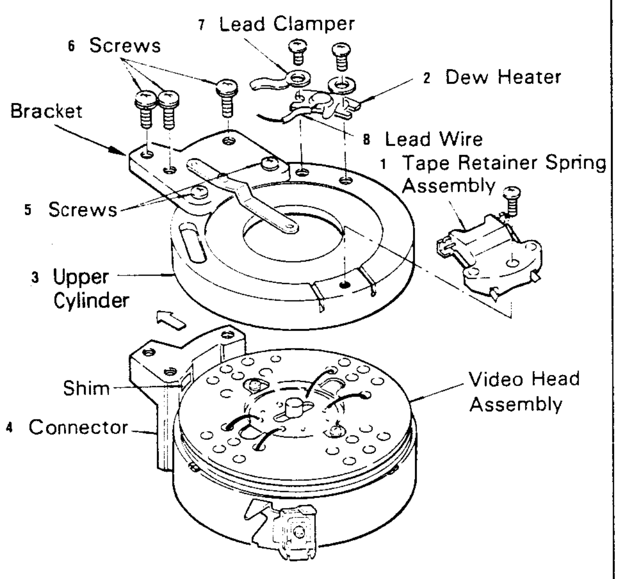


Fig. 48 Upper Cylinder

(7) Cylinder Assembly Checking

The cylinder assembly serves for oth transporting tape and supporting the scanner motor that revolves the video head assembly.

Check the tape path surface of the lower cylinder for scratches and other defects. If any, this adversely affects tape transportation. Replace the cylinder assembly.

If the cylinder assembly does not rotate freely, this is due to a defective bearing. Replace the cylinder assembly by following the steps below.

Replacement (See Fig. 49)

1. Remove the top cover and bottom plate.
2. Remove 3P connector ② (cylinder motor) and 10P connector ① (video head).
3. Open the PIF • selector circuit board and servo • logic circuit board and remove 3P connector ② (P608, 3P dew heater).
4. Loosen three screws ③ and remove scanner assembly ⑤.
5. Remove the rotor and stator. [refer to Item (5)]
6. Remove shield case ④ from cylinder assembly ⑤.
7. After replacing cylinder assembly, assemble it in the reverse order.

NOTE:

When installing cylinder assembly to the main base, twist it counterclockwise and then tighten screws ③.

Checking After Replacement

1. Playback the monoscope section of the alignment tape and observe the envelope waveform on the oscilloscope.
2. If the envelope waveform is not normal, follow the tape path adjustment as directed in Section 3-4-23.

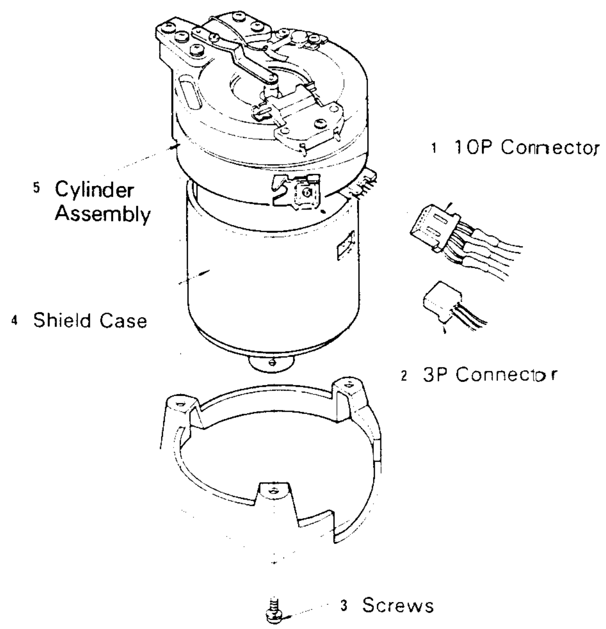


Fig. 49 Replacing the Cylinder Assembly

(8) Video Head Disk Assembly

Checking

1. Check if either video head has any damage, wear or clogging.
2. If the video head cannot be cleaned, by wiping it with cleaning bar moisted in isopropyl alcohol, replace it.

Replacement (See Fig. 50)

1. Remove the top cover. (refer to Section 3-4-1)
2. Remove the dew heater and the upper cylinder. [refer to Item (5)]
3. Unsolder four video head lead wires going to intermediate board ④.
4. Remove two screws ⑤ holding video head disk assembly ①.
5. Replace video head disk assembly ① leaving spacer ②, if any on flange ③.
6. Clean the upper and lower surface of video head disk assembly ① with cleaning bar moisted with isopropyl alcohol, and also, clean the surface of spacer ②.
7. Align marking (▲) on video head disk assembly ① with marking (▲) on intermediate board ④.
8. Temporarily tighten two screws ⑤ to hold video head disk assembly ① to flange ③ as light as possible.
9. Solder four video head lead wires to intermediate board ④.
10. Adjust the eccentricity of video head disk assembly ① as directed in Item (9).

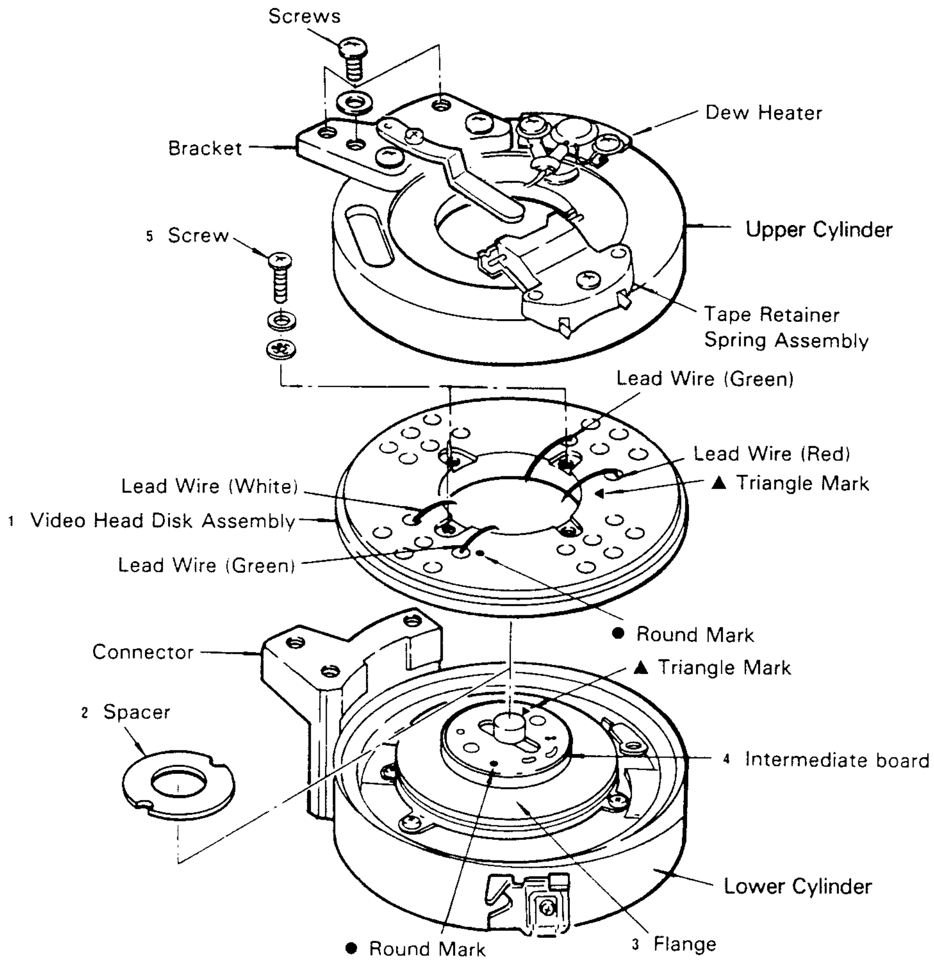

Screws
Bracket
Dew Heater
⑤ Screw
Upper Cylinder
Tape Retainer Spring Assembly
Lead Wire (Green)
Lead Wire (Red)
▲ Triangle Mark
Lead Wire (White)
① Video Head Disk Assembly
Lead Wire (Green)
● Round Mark
▲ Triangle Mark
Connector
② Spacer
④ Intermediate board
Lower Cylinder
● Round Mark
③ Flange

Fig. 50 Replacing the Video Head Disk Assembly

(9) Adjusting the Eccentricity of the Video Head Disk Assembly (See Figs. 51, 52, 53, 54)

Positioning the Eccentricity Gauge

1. Place jig ① on to connector ② and tighten screw ③ to fix jig 1 as illustrated Fig. 51.
2. Assemble jigs ①, ②, ③, ④, and ⑤ as illustrated in Fig. 52.
3. Loosen wing screw ① and adjust the position of probe ③ until it comes into contact with the top of video head disk assembly. (See Fig. 53) Tighten wing screw ①.
4. Loosen hex. head socket screw ⑥ and, adjust eccentricity gauge ⑦ until it is vertical to video head disk assembly ⑧, tighten hex. head socket screw ⑥. (See Fig. 52)
5. Loosen wing screw ① and adjust probe ③ of eccentricity gauge ④ until it touches top portion of video head disk assembly ② and the needle of eccentricity gauge ④ is at the center of the scale, then tighten wing screw ①. (See Fig. 53)

Adjustment (See Fig. 54)

1. While gently turning video head disk assembly ① clockwise by hand, read the eccentricity gauge.
2. Where eccentricity gauge indicates maximum reading, stop turning video head disk assembly ①. (See Fig. 54)
3. Fit a bladed screwdriver on the inside surface of video head disk assembly ① and lightly tap it toward the center of the cylinder until the needle returns a half of the maximum deflection measured in step 2.
4. Repeat the adjustment in steps 2 and 3 several times until the needle deflects as little as possible when video head disk assembly ① is rotated. (minimum eccentricity.)

NOTE:

The standard eccentricity is within 1 μm.

5. After adjustment, alternately tighten two screws ② little by little. The torque of each screw should be more than 10 kg.
6. Check the eccentricity of video head disk assembly ① again.

CAUTION:

Fit the wires close to the video head disk assembly so as not to allow them to touch the upper cylinder.

7. Reassemble the upper cylinder as directed in Item (5).

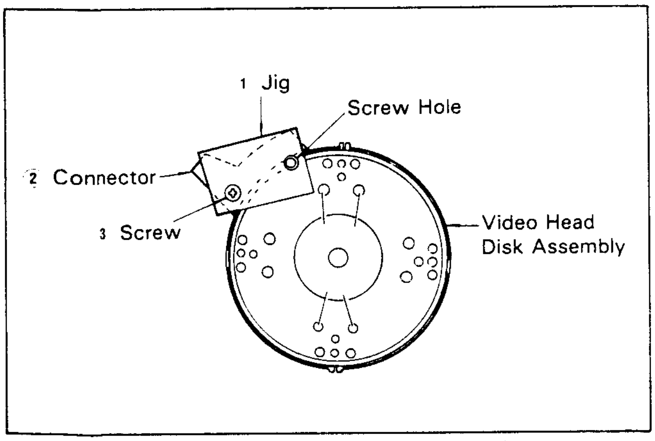

1 Jig
Screw Hole
2 Connector
3 Screw
Video Head
Disk Assembly

Fig. 51 Positioning the Eccentricity Gauge

Checking After Replacement

1. Playback the monoscope section of the alignment tape and observe the envelope waveform on the oscilloscope.
2. If the envelope waveform is not normal, follow the tape path adjustment as directed in Section 3-4-23.

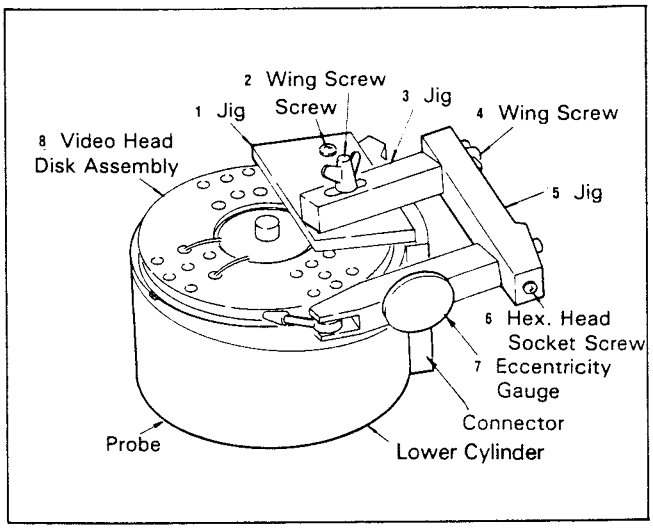

2 Wing Screw
1 Jig
Screw
3 Jig
4 Wing Screw
8 Video Head
Disk Assembly
5 Jig
6 Hex. Head
Socket Screw
7 Eccentricity
Gauge
Connector
Probe
Lower Cylinder

Fig. 52 Positioning the Eccentricity Gauge

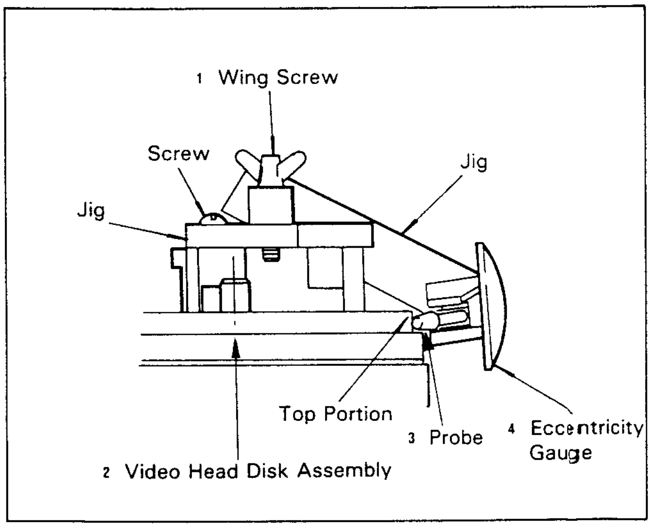

1 Wing Screw
Screw
Jig
Jig
Top Portion
3 Probe
4 Eccentricity
Gauge
2 Video Head Disk Assembly

Fig. 53 Positioning the Eccentricity Gauge

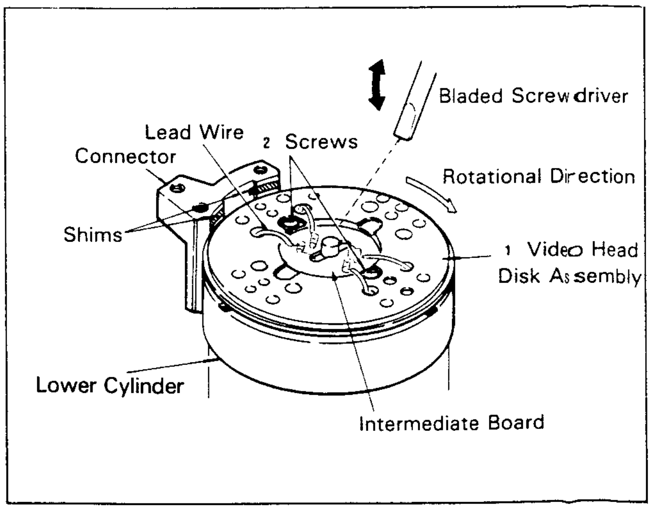

Bladed Screwdriver
Lead Wire
Connector
2 Screws
Rotational Direction
Shims
1 Video Head
Disk Assembly
Lower Cylinder
Intermediate Board

Fig. 54 Adjusting the Eccentricity Gauge

3-3-21 . EXIT GUIDE ASSEMBLY

(1) Replacement (See Figs. 55, 56)

1. Remove two screws ① .
2. Lift exit guide assembly ② upward and unsolder the lead wires.
3. Replace exit guide assembly ② .
4. Assemble exit guide assembly ② by reversing steps 1 through 3.

CAUTION:

Before tightening screws ① , put the lead wires under the exit guide assembly.

a. The yellow cylinder head wires should be far away from the scanner assembly.

b. The lead wires should not be clipped between the connector for the cylinder assembly and the exit guide assembly.

5. Follow tape path adjustment as directed in Section 3-4-23.

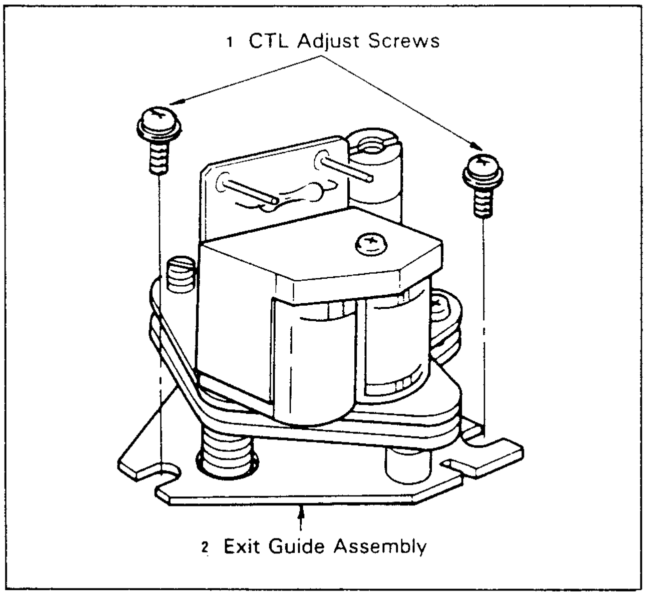

1 CTL Adjust Screws
2 Exit Guide Assembly

Fig. 55 Exit Guide Assembly

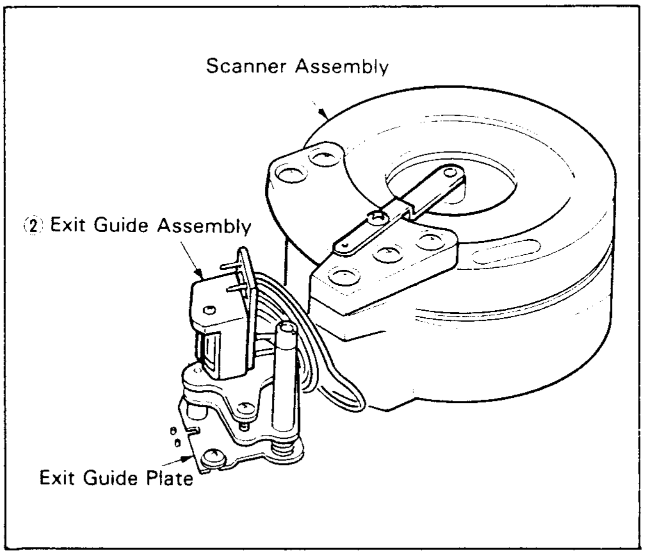

Scanner Assembly
② Exit Guide Assembly
Exit Guide Plate

Fig. 56 Exit Guide Assembly

3-3-22. FULL WIDTH ERASE HEAD ASSEMBLY (See Figs. 57, 58)

(1) Replacement

1. Unclamp the lead wires from the clamper. (See Fig. 57)
2. Unsolder the lead wires from tape end sensor ② and full width erase head ① . (See Fig. 57)
3. Remove nut ① and screw ⑥ (See Fig. 58)
4. Remove upper flange ② , entrance guide pole ③, lower flange ④ and spring ⑤ . (See Fig. 58)
5. Lift full width erase head ① upward and remove nut ③ and tape end sensor ② . (See Fig. 57)
6. Replace full width erase head ① .
7. Follow the tape path alignment as directed in Section 3-4-23.

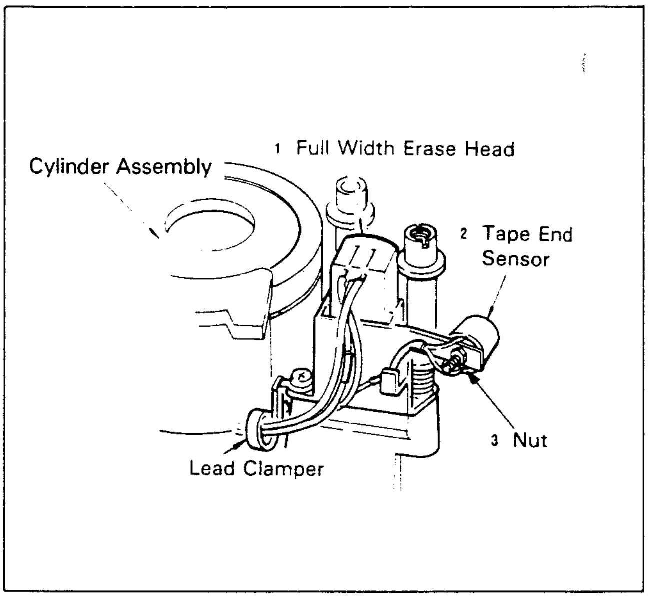

Cylinder Assembly
1 Full Width Erase Head
2 Tape End Sensor
3 Nut
Lead Clamper

Fig. 57 Arranging the Lead Wires of Full Width Erase Head

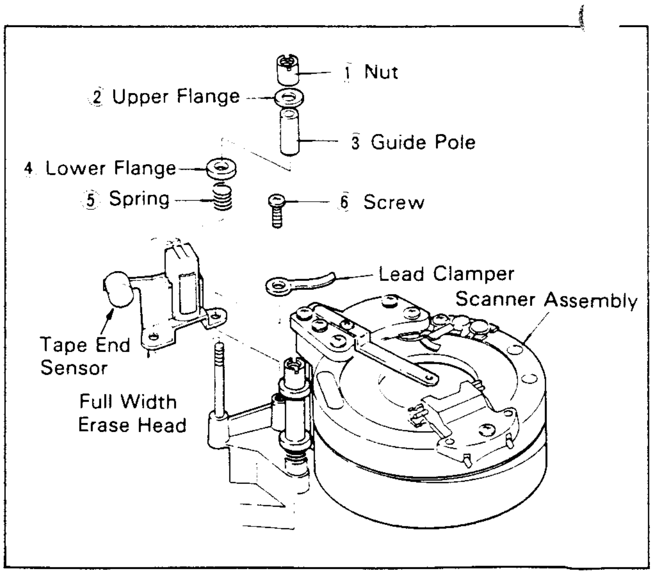

① Nut
② Upper Flange
③ Guide Pole
④ Lower Flange
⑤ Spring
⑥ Screw
Lead Clamper
Scanner Assembly
Tape End Sensor
Full Width Erase Head

Fig. 58 Full Width Erase Head

3-3-23. TRACKING ADJUSTMENT

Tracking adjustment should be done by following the steps in sequence:

1. Tape path alignment.
2. Audio azimuth alignment.
3. Audio/control head height alignment.
4. Control head position alignment.

(1) Instrument and Tools Required

[Tools]

Alignment test tape (KR5-1Z).
Oscilloscope.
Dental mirror (to check the tape transportation).
Eccentric screwdriver.
Isopropyl alcohol with cleaning bar.

[Test point]

TP-202 (VIDEO • CIRCUIT BOARD): Envelope.
P510 pin ① (SERVO • LOGIC CIRCUIT BOARD): RF switching pulse.

(2) Tape Path Alignment

If the tape path is misaligned, this considerably affects the performance of the VTR. For example, it disturbs the picture, scratches tape, and results in no VTR interchangeability. (the tape recorded by one VTR cannot be played back by another.) Whenever any of the services listed below has been carried out, checking should be performed in the audio line output level and envelope waveform and that the tape is not twisted. If necessary, tape path adjustment should be performed.

a. Replacement of the tension lever assembly.
b. Replacement of the upper and lower scanner.
c. Replacement of the video head disk assembly.
d. Replacement of the audio and control head.
e. Replacement of the full width erase head.

CAUTION:

Servicemen should be fully trained in the tape path adjustment as this requires highly advanced technique and skill.

(2)-a Rough Adjustment (See Figs. 59, 60, 61)

CAUTION:

In rough adjustment, the alignment test tape should not be used as it could be damaged. Use a regular recorded tape. The tape transport arrangement should be checked in the playback mode of operation.

1. Before doing this alignment, clean the tape guides, the surface of cylinder, the pinch roller, the capstan and the surrounding parts, by using isopropyl alcohol with the cleaning bar or cotton cloth.
2. Check the tape on the flange guide for curl.
3. Check the tape at the inlet and outlet of the capstan and scanner for wrinkle and curl.
4. If there is any curl or wrinkle, adjust nuts ①, ②, and ③ (See Fig. 59) until it is eliminated, while running the tape along the upper flange of the tape guide.
5. In adjustment, also, make sure that there is no curl between the tape and the upper flange of the tape guide by using the dental mirror. (See Figs. 60, 61)
6. Connect the probe of oscilloscope to TP-202 on the VIDEO • AUDIO circuit board, and apply the external trigger from P510 pin ① on the servo • logic circuit board to the oscilloscope.
7. Playback the tracking section of alignment tape, and confirm whether the level of envelope is flat when turning the tracking control in both directions from the center click position.
Unless the evelope is flat, adjust ment should be made in the following Steps (2)-c and (2)-d.
8. When the level of envelope becomes maximum by turning the tracking control, confirm that evelope is as shown in Fig. 64.
If the envelope is not as shown in Fig. 64, adjustment should be made in the following Steps (2)-c and (2)-d.

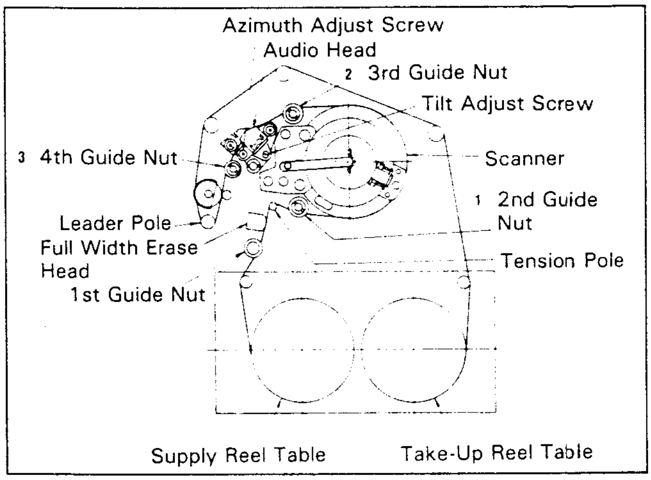


Fig. 59 Tape Path Alignment

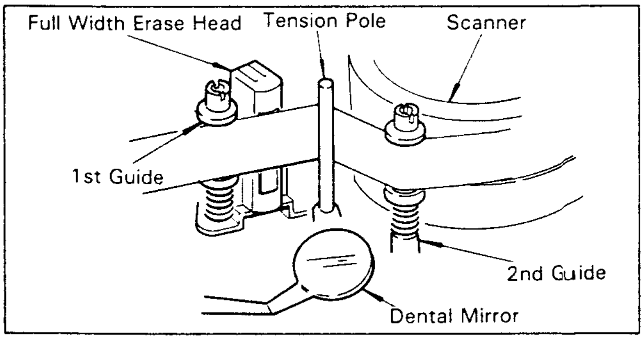


Fig. 60 Tape Transport Adjustment A

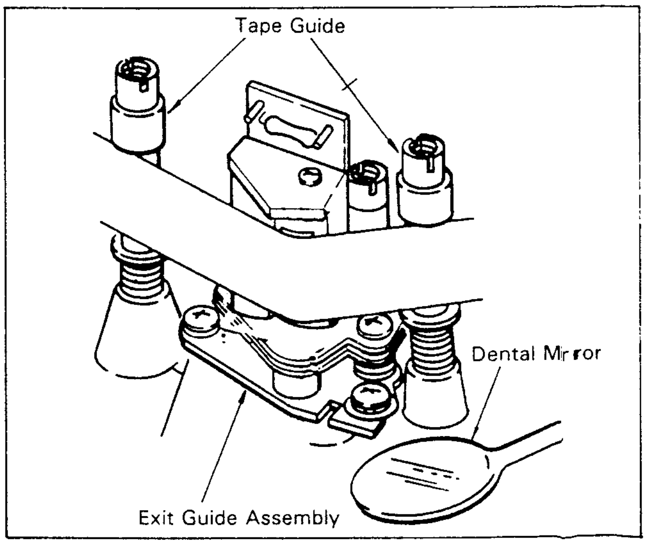


Fig. 61 Tape Transport Adjustment B

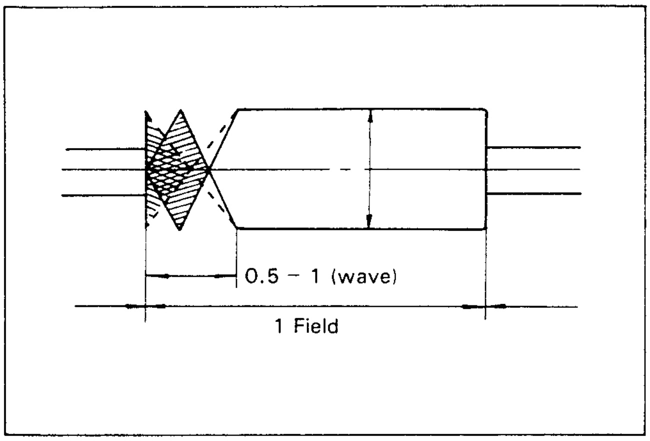

0.5 – 1 (wave)
1 Field

Fig. 72 Entrance Side Envelope Waveform

(4) Tracking Adjustment After Replacement of the Exit Guide Assembly

1. Playback the monochrome section of alignment tape.
2. Adjust the exit guides to maintain the flat envelope as explained in Step (2)-d.
3. If the tape has curl or wrinkle at the exit side, or the envelope is not flat, the following adjustment is needed.
   a. Adjust the clearance between the upper flanges and the tape upper portion for approximately 0.5 mm. (See Fig. 75)
   b. Confirm whether the envelope becomes flat when pressing or lifting the tape by the finger.
   c. Adjust tilt adjust screw 1 (See Fig. 73) to obtain the flat envelope. (See Fig. 74)
   d. After adjusting tilt adjust screw 1, adjust the exit side adjustment as explained in Item (2)-d.

CAUTIONS:

1. When turning tilt adjust screw 1 counterclockwise, position of the cylinder tape should be up.
   When turning tilt adjust screw 1 clockwise, position of the scanning tape should be down. (See Fig. 73)
2. Tilt adjust screw 1 should be adjusted by a half quarter turn.
3. Do not tighten the 4th guide 2 too much since the audio level is varied easily. (See Fig. 65)

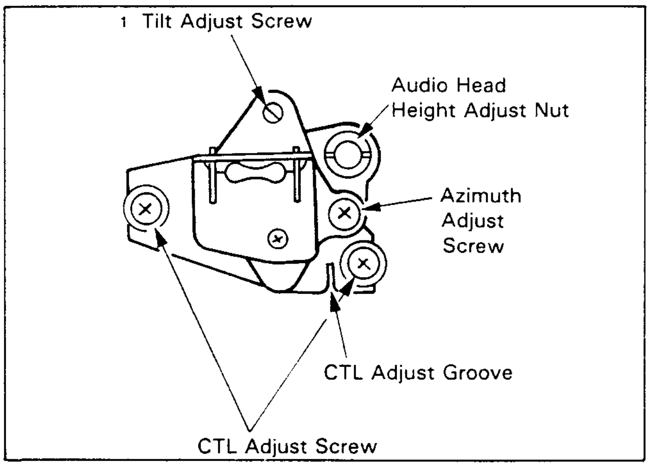

1 Tilt Adjust Screw
Audio Head Height Adjust Nut
Azimuth Adjust Screw
CTL Adjust Groove
CTL Adjust Screw

Fig. 73 Adjustment Screws of Exit Guide Assembly

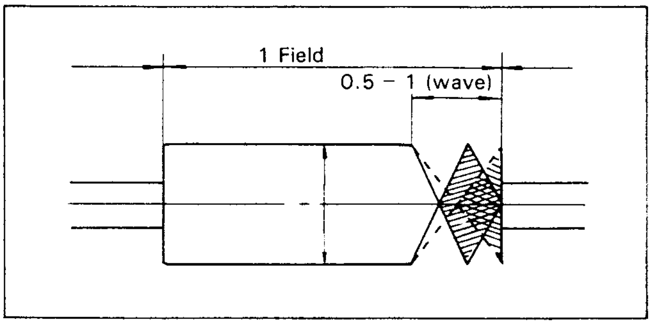

1 Field
0.5 – 1 (wave)

Fig. 74 Exit Side Envelope Waveform

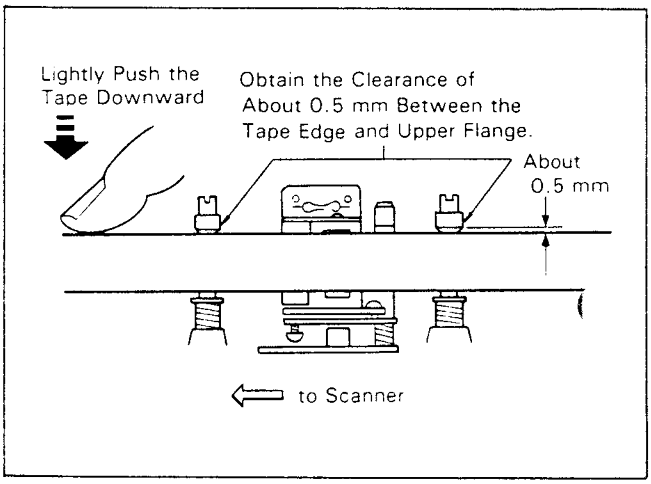

Lightly Push the Tape Downward
Obtain the Clearance of About 0.5 mm Between the Tape Edge and Upper Flange.
About 0.5 mm
to Scanner

Fig. 75 Exit Tape Path Adjustment

(5) Audio Azimuth Adjustment

1. Connect the VTVM to the audio line out terminal. (See Fig. 76)
2. Playback the tracking section of alignment tape.
3. Adjust to obtain the maximum audio level by turning the audio azimuth adjust screw 1. (See Fig. 77)

(6) Audio/Control Head Height Adjustment

1. Adjust nut 2 to obtain the maximum level of audio by a half quarter turn during playback of the 333 H[illegible]ection of alignment tape. (See Fig. 77)
2. Playback the 5 kHz section of the alignment tape. Confirm that the amplitude is within 20% of the level of 333 Hz.

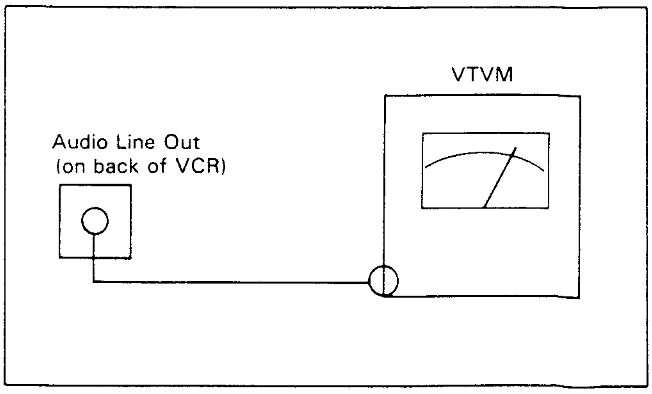

VTVM
Audio Line Out (on back of VCR)

Fig. 76 Audio Output Level

(2)-b Tape Path Alignment

1. Misalignment of tape path → Proceed with entrance side adjustment. (refer to Item (2)-c)
   → Proceed with exit side adjustment. (refer to Item (2)-d)
2. Replacement of tension lever assembly → Proceed with rough adjustment. (refer to Item (2)-a)
3. Replacement of upper scanner assembly and lower cylinder assembly
   ↓
   check the tape path → Proceed with entrance side adjustment. (refer to Item (2)-c)
   → Proceed with exit side adjustment. (refer to Item (2)-d)
4. Replacement of video head disk assembly
   ↓
   check the tape path → Proceed with entrance side adjustment. (refer to Item (2)-c)
   → Proceed with exit side adjustment. (refer to Item (2)-d)
5. Replacement of exit guide assembly (audio/control head assembly) → Proceed with rough adjustment. (refer to Item (2)-a)
6. Replacement of full width erase head → Proceed with entrance side adjustment. (refer to Item (2)-c)

CAUTION:

Before tape path alignment, make rough alignment using the recorded tape other than the standard alignment tape.

(2)-c Entrance Side Adjustment (See Figs. 63, 64)

If the level of envelope is not flat as shown in Fig. 64, adjust the height of 2nd guide ② to obtain the flat envelope. Confirm the tape has no curl or wrinkle at guide 1st ① or 2nd ② when playing back L-830 type cassette.

(2)-d Exit Side Adjustment (See Figs. 65, 66)

If the level of envelope at the exit side is not flat as shown in Fig. 66, adjust the height of 3rd guide ① and 4th guide ② to obtain the flat envelope.
Confirm that the tape has no curl or wrinkle at guide 3rd ① or 4th ② when playing back L-830 type cassette.

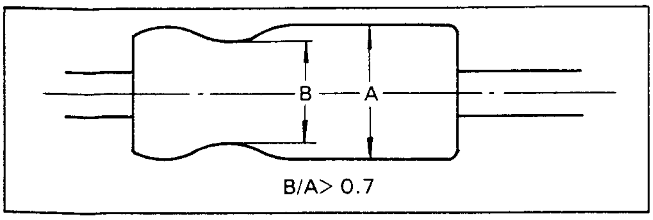


Fig. 62 Envelope

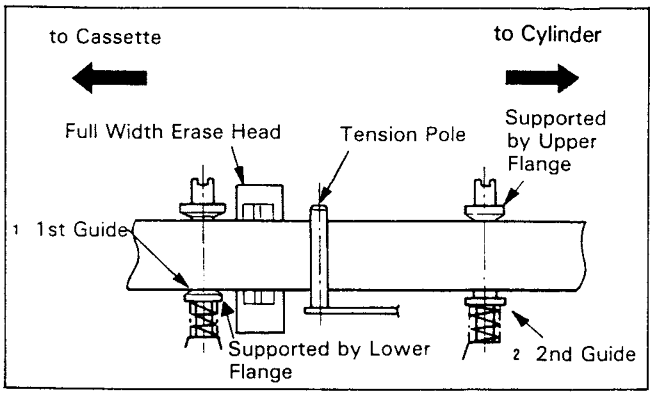

to Cassette
to Cylinder
Full Width Erase Head
Tension Pole
Supported by Upper Flange
① 1st Guide
Supported by Lower Flange
② 2nd Guide

Fig. 63 Entrance Side Tape Path

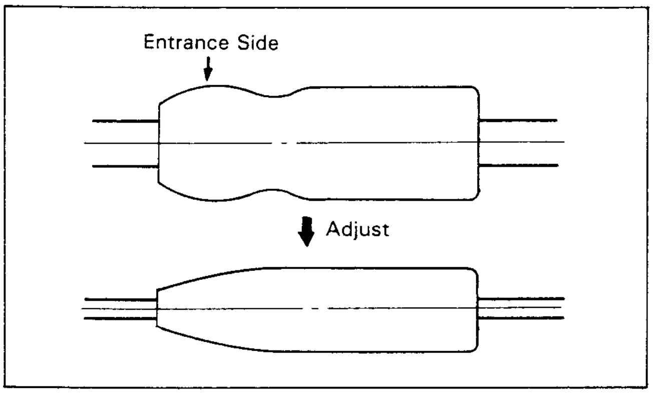

Entrance Side
Adjust

Fig. 64 Envelope

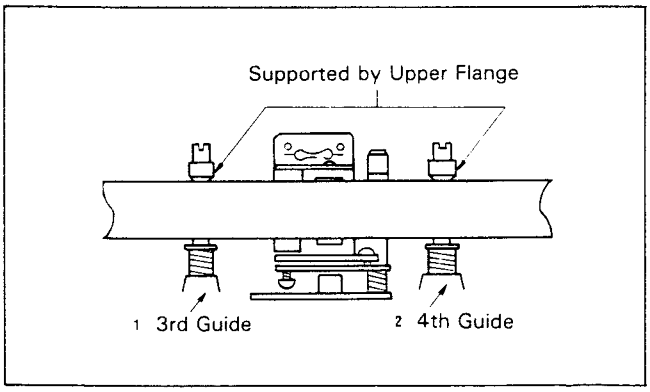

Supported by Upper Flange
① 3rd Guide
② 4th Guide

Fig. 65 Exit Side Tape Path

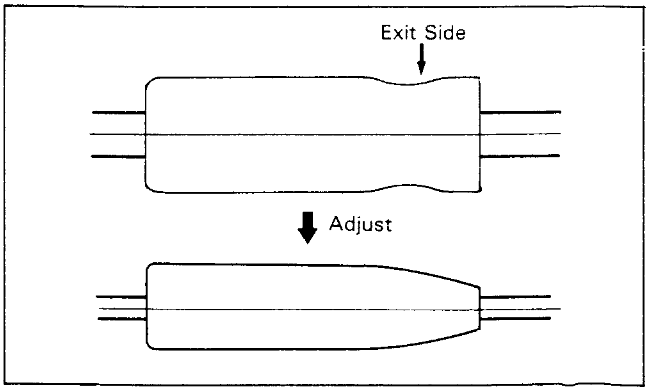

Exit Side
Adjust

Fig. 66 Envelope

(3) Entrance Side Adjustment After Replacement of the Tension Lever Assembly

This adjustment is not necessary if the tape has no curl or wrinkle after replacement of the tension lever assembly.
If the tape has curl or wrinkle, adjust the entrance side tape guides as described in step (2)-c.
If the tape still has curl or wrinkle after adjusting the above (2)-c, confirm and adjust as follows:

(3)-a Checking the Vertical Angle of Tension Pole

a. Hold the tool for adjusting the height of the cassette reference plate to the tape tension pole and make certain that clearance is 0.1 mm or less. (See Figs. 67, 68, 69) If the clearance is large, loosen screw 1 and adjust by turning tilt adjust screw 2, 3. (See Fig. 70)
b. Then, turn the tilt adjust screw 3 (for Y direction) 90 degrees clockwise.
c. Tighten the fixing screw 1 45 degrees clockwise from the slightly contacting position.

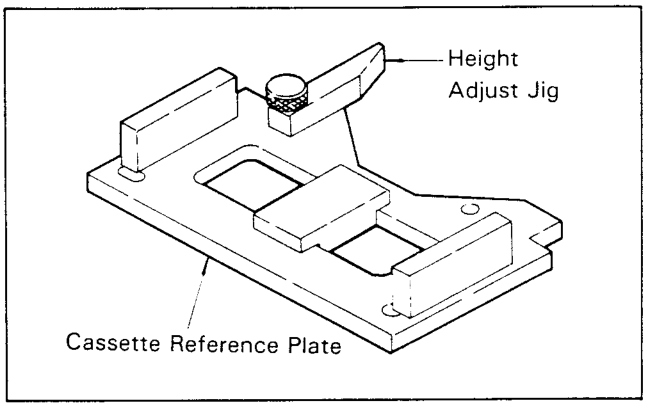

Height Adjust Jig
Cassette Reference Plate

Fig. 67 Cassette Reference Plate

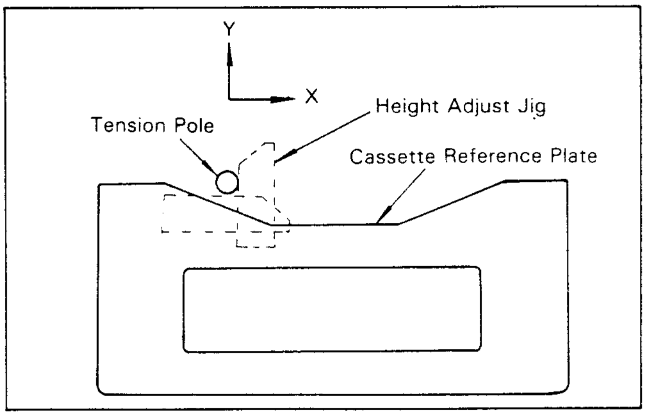

Y
X
Tension Pole
Height Adjust Jig
Cassette Reference Plate

Fig. 68 Checking the Vertical Angle of Tension Pole (1)

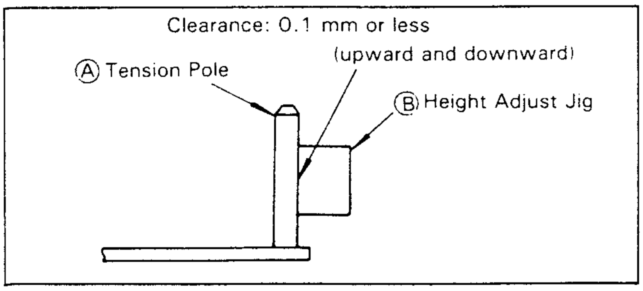

Clearance: 0.1 mm or less
(upward and downward)
Ⓐ Tension Pole
Ⓑ Height Adjust Jig

Fig. 69 Checking the Vertical Angle of Tension Pole (2)

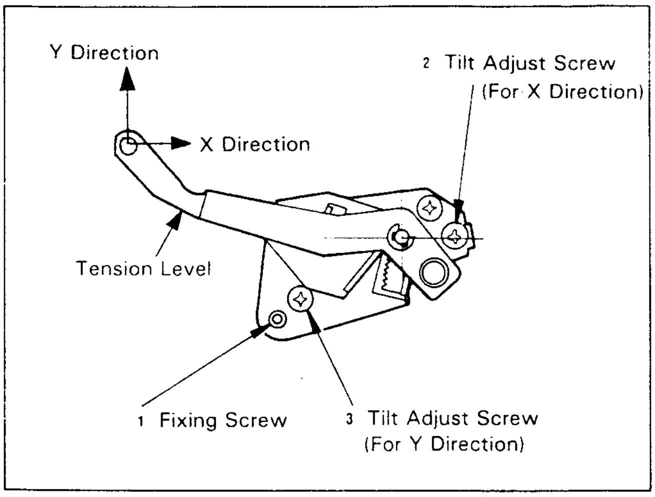

Y Direction
X Direction
2 Tilt Adjust Screw
(For X Direction)
Tension Level
1 Fixing Screw
3 Tilt Adjust Screw
(For Y Direction)

Fig. 70 Adjustment of the Tilt Screw

(3)-b 1st Guide Height Adjustment

Adjust the height of 1st guide with height adjust jig (See Fig. 67) to 18.75 mm from the cassette base reference level. (See Fig. 71)

NOTE:

After taking the height as 19.0 mm turn 1st guide nut clockwise 180 times.

(3)-c

Adjust the height of 2nd guides 2 to maintain the clearance between the guide upper plates and the tape upper portion at approximately 0.5 mm (See Fig. 63) and confirm that there is no cross portion in the envelope.
If there is a cross portion in the envelope, adjust screw 3 (See Fig. 70) by a half quarter turn to eliminate it.

NOTE:

Do not turn screw 3 more than 90 degrees.

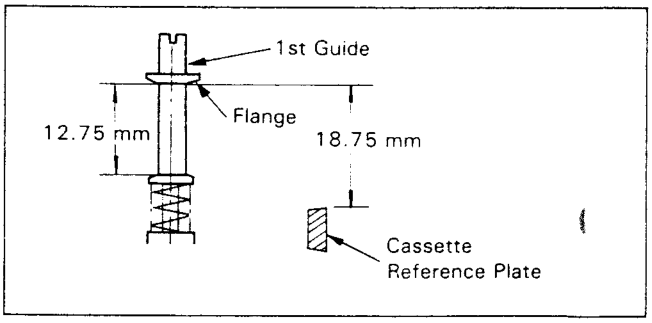

1st Guide
Flange
12.75 mm
18.75 mm
Cassette Reference Plate

Fig. 71 Adjustment of 1st Guide Height

(3)-d

Playback the tracking section of alignment tape and check that one or a half cross portion appears in the envelope (See Fig. 72)
If so, proceed Item (2)-c.
If not, proceed as follows:

a. If the cross portion is more than one, turn tilt adjust screw 3 until envelope waveform is as Fig. 72. Then, proceed with Item (2)-c. (See Fig. 70)
b. If the cross portion is less than half, adjust 1st guide until envelope waveform is as Fig. 72. And, rewinding the L-830 type cassette, if the tape is wrinkled, turn tilt adjust screw 3 until the tape is straightened. Then, proceed with Item (2)-c. (See Fig. 70)

(7) CTL Position Adjustment (See Fig. 77)

1. Playback tracking section of the βII alignment tape.
2. Set the tracking control knob at the center click position.
3. Loosen screw ③ for the CTL adjustment and adjust the position of the CTL head with bladed screwdriver so that the envelope reaches its maximum output.
4. Verify that the audio/CTL head is positioned at about the center of CTL adjust grove ④ guide base.
5. Retighten two screws ③ for the CTL adjustment.
6. Playback the βIII monochrome signal of the alignment tape.
7. Set the tracking control knob at center click position.
8. Verify that the envelope reaches its maximum output.
9. If the envelope does not reach its maximum output, repeat item 1 to 5.

NOTE:

Before this adjustment, verify that the playback phase of tracking is Omsec with tracking control is center click position.

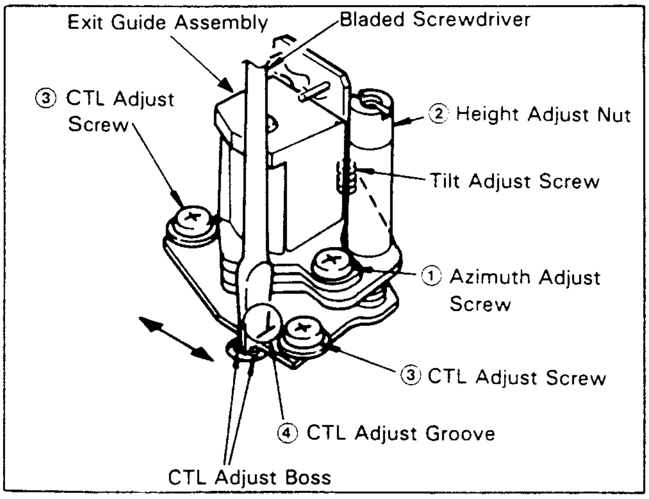


Fig. 77 CTL Adjustment

3-3-24. PERIODIC INSPECTION AND MAINTENANCE

Maintenance Items and Period

The VTR should be maintained for best performance at all times in accordance with the table below.

NOTE:

For cleaning, use isopropyl alcohol.

CAUTION:

Disconnect all power from the VTR before cleaning any parts.

(1) Cleaning the Video Heads

To clean the video heads, wipe them with a cleaning bar of deer skin moistened in isopropyl alcohol.

CAUTION:

Never leave the video heads revolving during cleaning or they could be damaged.

The heads and scaner should be cleaned by lightly moving the cleaning bar right and left on the surface as shown in Fig. 78.

(2) Cleaning the Audio and Control Head and Full Width Erase Head

To clean the audio and control heads and full width erase head, move the cleaning rod right and left on the surface as shown in Fig. 79.

(3) Cleaning the Capstan Assembly and Capstan Bearing Assembly

To clean these assemblies, first remove the cabinet as directed Section 4-1.

Remove the video circuit board and servo • logic circuit board and VIDEO • AUDIO Circuit Board. Now, clean the assemblies.

NOTE:

Maintenance periods listed in the table may be changed depending on the conditions of customer's operations since they are determined as standard periods as normal operating conditions.

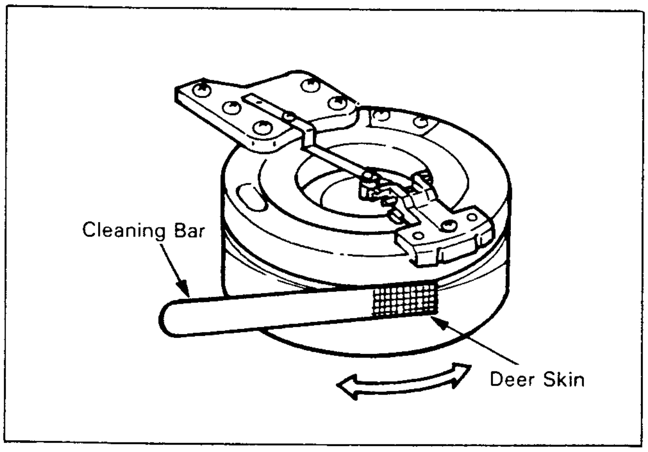


Fig. 78 Video Head Cleaning

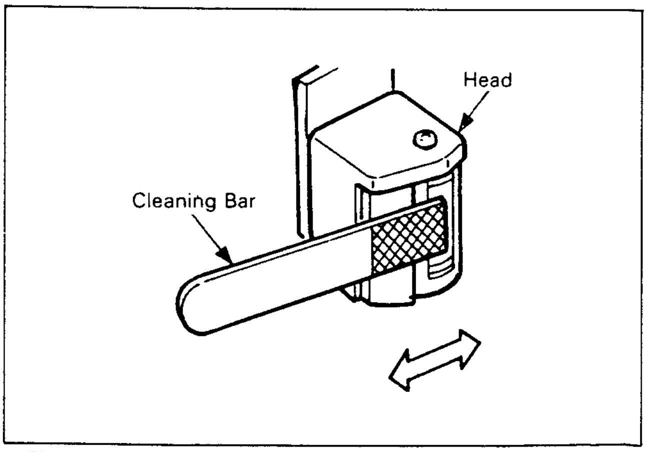


Fig. 79 Audio and Control Head and Full Width Erase Head Cleaning

(4) Cleaning the Belts, Idlers, and Pulleys

To clean these parts, use a cleaning rod having cotton at each end or a cloth moistened a little in isopropyl alcohol. (See Fig. 80)

CAUTIONS:

1. Each flat belt should be installed with the white mark facing outside and the arrow indicating the revolutional direction as shown in Fig. 81.
2. The square belts should not be twisted. (See Fig. 82)

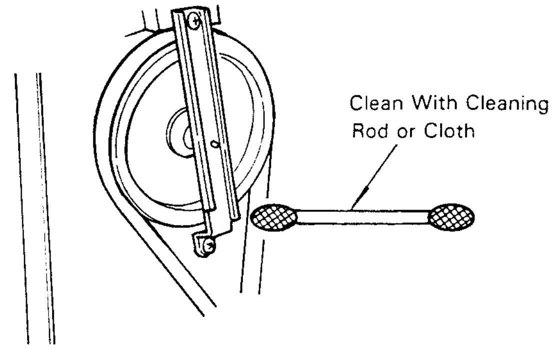


Fig. 80 Cleaning the Belts, Idlers, and Pulleys

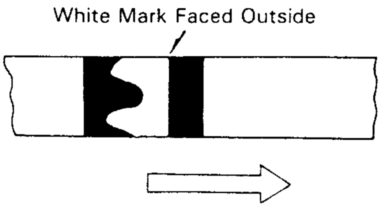


Fig. 81 Flat Belt

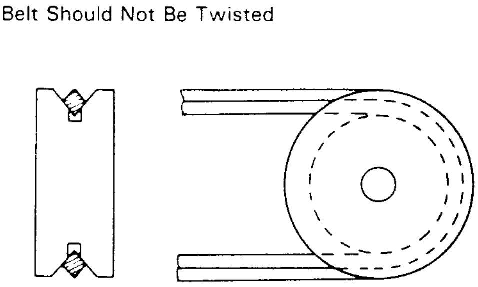
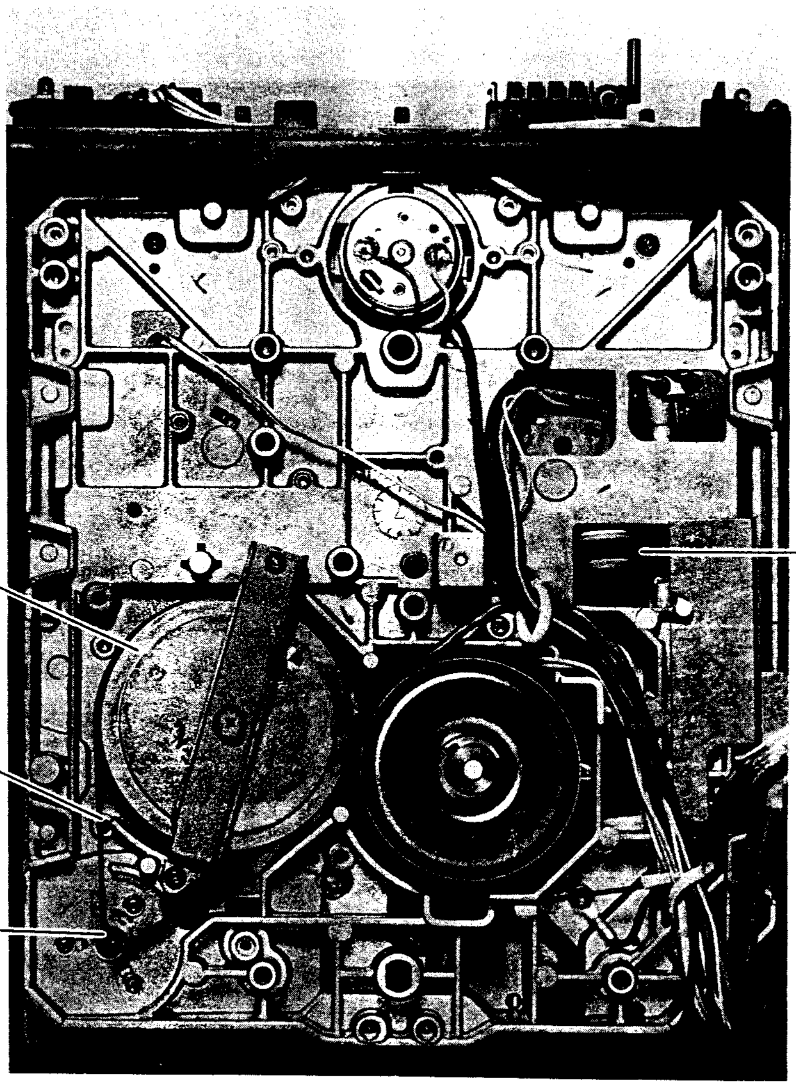


Fig. 82 Square Belt

PERIOD (HOURS) ITEM	500	1000	1500	2000	2500	3000	3500	4000	5000	40000
Video head disk assembly	△	△ ○	△	△ ○	△	△ ○	△	△ ○	△ ○	
Audio and control head assembly	△	△	△	△	△	△	△	△	△	
Capstan assembly		△ ▲		△ ▲		△ ▲		△ ▲	△	
Capstan bearing assembly		△ ▲		△ ▲		△ ▲		△ ▲	△	
Pinch roller		△		△		△ ○		△		△
Dew sensor element				△				△		
Reel drive assembly										○
Capstan belt				○				○		
Loading belt										○
Counter belt					○				○	
Supply reel table assembly				△ ▲				△ ▲		
Take-up reel table assembly				△ ▲				△ ▲		
Fast-forward idler assembly										○
Band brake assembly				○				○		
Scanner motor									○	
Tape guides	△	△	△	△	△	△	△	△	△	
Capstan motor						○				
Loading drive assembly										○
Reel motor				○				△ ○		

NOTE;
○ indicates replacement, ▲ lubrication, and ▷ cleaning.

3-4-25. CLEANING AND LUBRICATION ON THE LOWER SURFACE OF THE CHASSIS



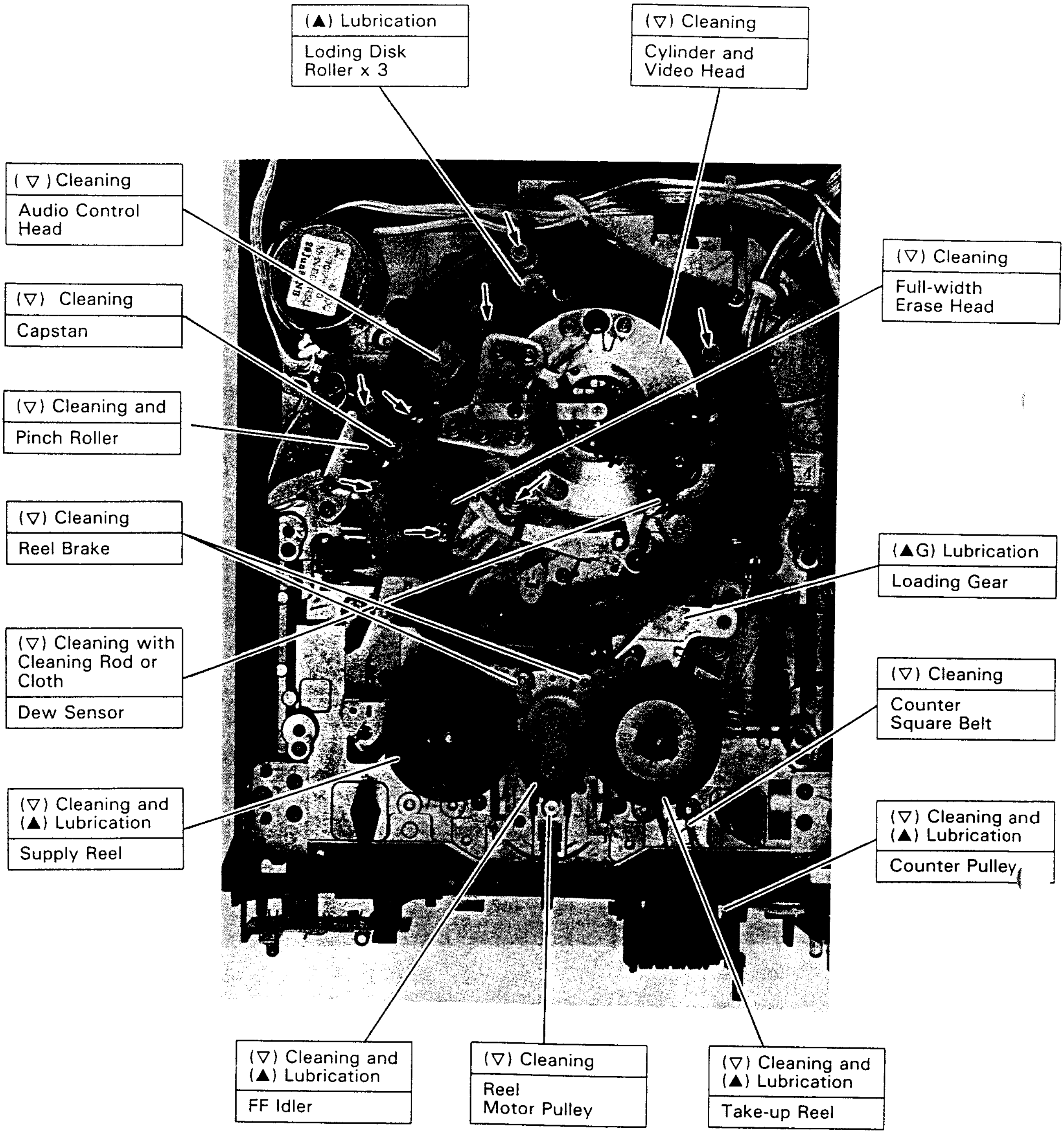
(▽) Cleaning
Capstan and Flywheel

(▽) Cleaning
Capstan Belt

(▽) Cleaning
Capstan and Motor Pulley

(▽) Cleaning
LC Belt

3-4-26. CLEANING AND LUBRICATION ON THE UPPER SURFACE OF THE CHASSIS



(▲) Lubrication
Loding Disk Roller x 3

(▽) Cleaning
Cylinder and Video Head

(▽) Cleaning
Audio Control Head

(▽) Cleaning
Capstan

(▽) Cleaning and
Pinch Roller

(▽) Cleaning
Reel Brake

(▽) Cleaning with Cleaning Rod or Cloth
Dew Sensor

(▽) Cleaning and
(▲) Lubrication
Supply Reel

(▽) Cleaning
Full-width Erase Head

(▲G) Lubrication
Loading Gear

(▽) Cleaning
Counter Square Belt

(▽) Cleaning and
(▲) Lubrication
Counter Pulley

(▽) Cleaning and
(▲) Lubrication
FF Idler

(▽) Cleaning
Reel Motor Pulley

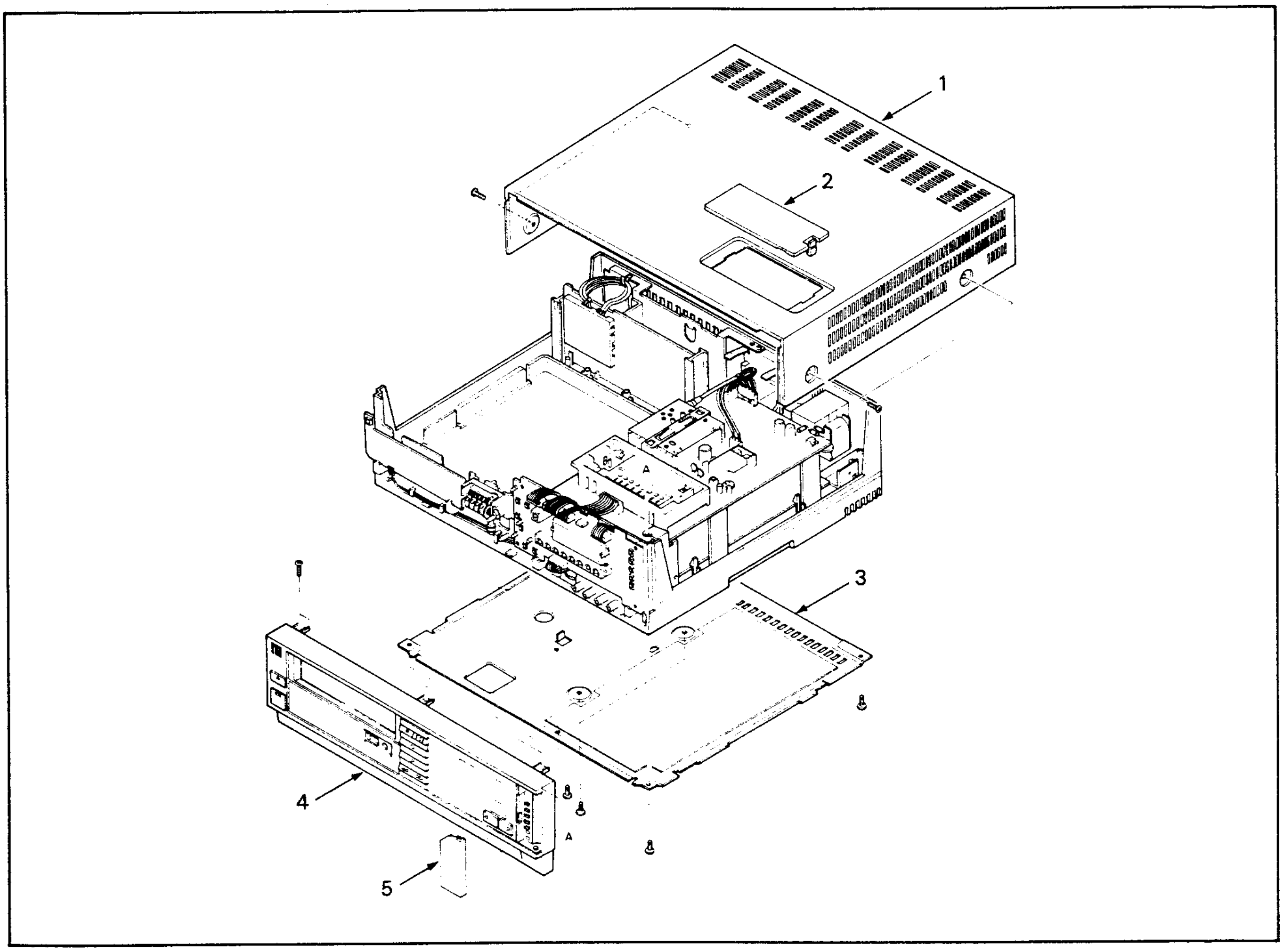
(▽) Cleaning and
(▲) Lubrication
Take-up Reel

Remarks:
▽: Cleaning
▲: Lubrication (with a specified lubricant)
▲G: Greasing

Note:
→: Cleaning of tape guide

SECTION 4. EXPLODED VIEWS AND PARTS LIST

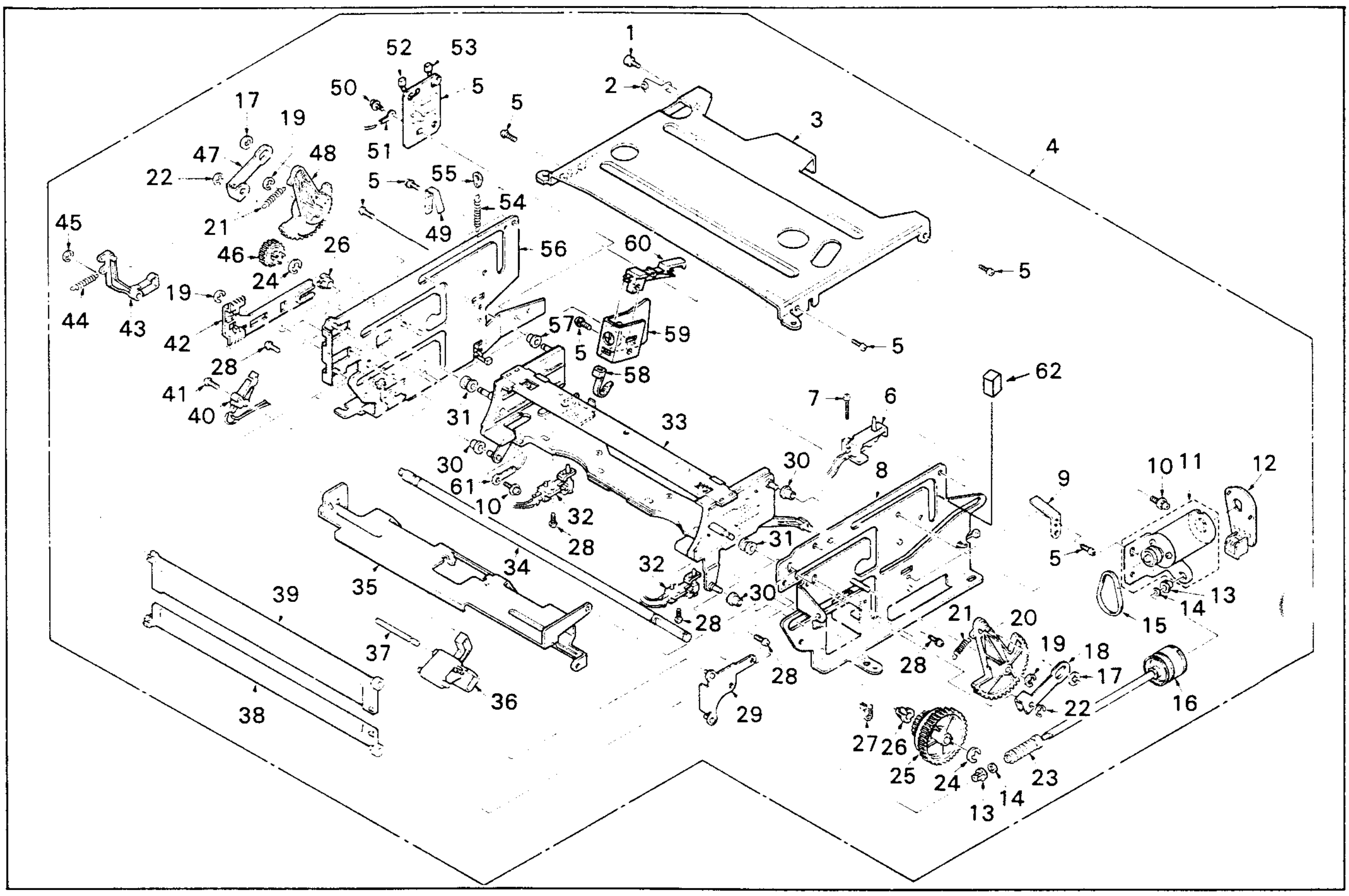
4-1. CABINET ASSEMBLY



Key No.	Location No.	Part No.	Description
1	A102	70814212	Top Cover
2	A102B	70863136	Door, Top
3	A103		Bottom Shield Assembly
4	A101	70812253	Front Panel
5	A101B	70863124	Door, Front

NOTE: Parts without Parts Number in Parts List are not available as replacement parts.

4-2. FRONT LOADING ASSEMBLY


1
52
53
50
5
5
2
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19
3
47
48
51
4
22
5
55
45
21
54
49
26
46
56
60
24
5
19
44
43
42
57
59
5
5
28
62
41
58
7
6
40
31
33
30
12
10
11
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30
8
61
10
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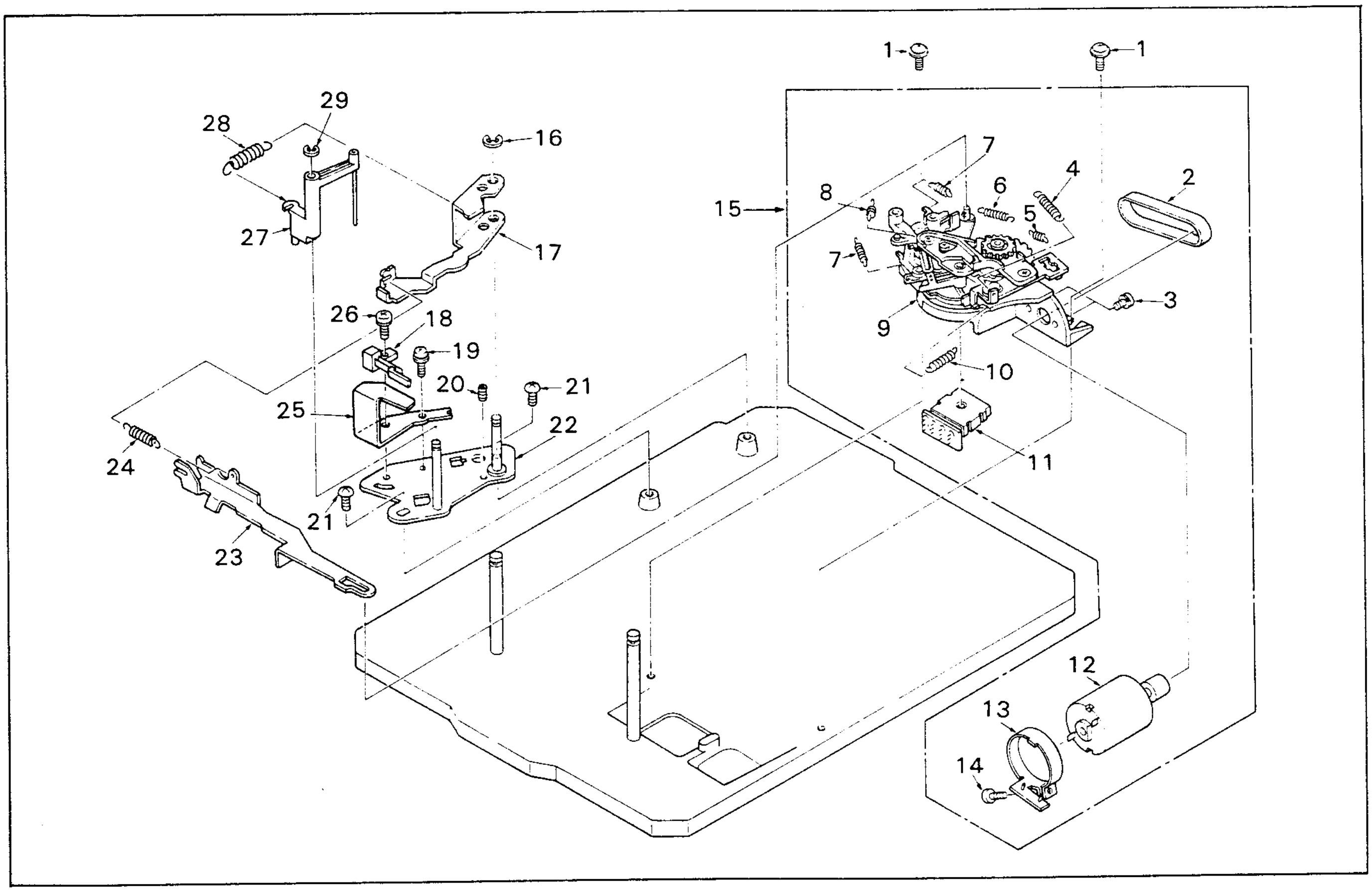
13

Key No.	Location No.	Part No.	Description
1	K360B		Screw, 2.6 x 6 mm
2	K348		Spring, Wire Hold
3	K360		Top Board
4	K301	70314036	Front Loading Assembly
5	K360A		Screw, 2.6 x 5 mm
6	S621	70145111	Switch, Error Erase Prevention
7	S621F		Screw, 2.6 x 12 mm
8	K320		Bracket, Right
9	K337		Spring
10	K325A		Screw, 3 x 5 mm
11	K325	70324190	Bracket Assembly, Motor
12	U621		Switch Trans Board, Front Loading
13	K336		Shaft Holder B
14	K322J		Polyslider, 2.6 x 4.7 x 0.5 mm
15	K335	70342083	Belt, Square, Loading
16	K322		Worm Shaft Assembly
17	K334	70394060	Washer C STW-3
18	K330		Link, Connector, Right
19	K333A		E-Ring 3 mm
20	K333		Arm, Gear
21	K332		Spring, Cassette Lock
22	K330A	70394075	E-Ring
23	K326		Worm Gear
24	K353A		E-Ring
25	K353		Worm Wheel
26	K350		Shaft Holder A
27	S621C		Lead Holder
28	K354A		Screw, 2.6 x 4 mm
29	K223		Bracket Assembly
30	K358		Guide Roller B
31	K357		Guide Roller A
32	S632	70145193	Switch, Cassette Detect
33	K303A		Bracket, Cassette Holder
34	K352		Shaft Gear
35	K354		Bracket, Cassette Guide
36	K355		Lever
37	K356		Shaft
38	K371	70863063	Door, Lower
39	K370	70863062	Door, Upper
40	S631	70145195	Switch, Slot Out
41	S631E		Screw, 2 x 10 mm
42	K342		Slider, Door
43	K343		Lover, Door
44	K345		Spring, Door Chose
45	K343A		E-Ring, 2 mm
46	K351		Gear, Drive L
47	K331		Link, Connector, Left
48	K340		Cam Gear
49	K338	70352065	Spring
50	U631D		Screw, 3 x 6 mm
51	K372	23094301	Lag Terminal
52	U631B		Lead Holder
53	U631		Switch Trans Board Front Loading
54	K347		Spring, Wire Guide
55	K346		Guide Plate
56	K321		Blacket Left
57	K359		Guide Roller C
58	S634C		Lead Holder
59	K349		Bracket, Cassette Down Switch
60	S634	70145168	Switch, Leaf
61	W134		Wire
62	K365		Cushion, FL motor

NOTE: Parts without Parts Number in Parts List are not available as replacement parts.

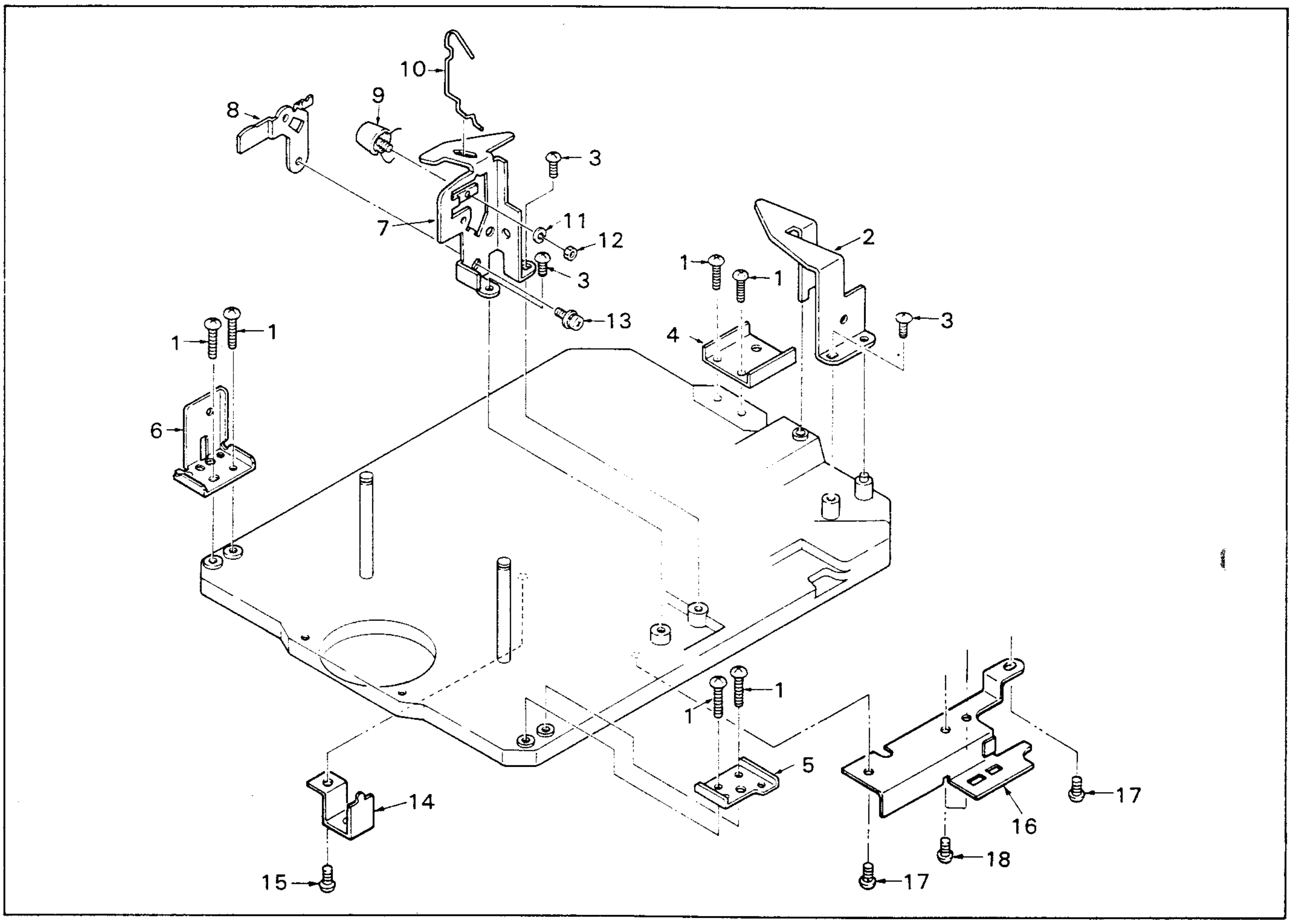
4-3. LOADING CAM UNIT COMPARTMENT ASSEMBLY



Key No.	Location No.	Part No.	Description
1	B501A		Screw, 3 x 8 mm
2	B508	70342092	Bolt, Loading Cam
3	B504		Screw, 2.6 x 6 mm
4	B529	70351405	Spring, Lock Arm
5	B510		Spring, Ratchet
6	B519	70351402	Spring, Cam Arm
7	B527	70351403	Spring, Lock Arm A
8	B523	70351404	Spring, Lock Arm B
9	B502		LC Motor Bracket Assembly
10	B533	70351408	Spring Reverse Prevention
11	B509	70145199	Cam Switch Assembly
12	B503	70322225	Motor Assembly, LC
13	B503A		Shield Assembly
14	B503C		Screw, 2.6 x 6 mm
15	B501		LC. Drive Assembly
16	B122A		E-Ring 3 mm
17	B122		Pinch Lock Lever
18	S656	70145168	Switch, Leaf
19	B126		Screw, 3 x 5 mm
20	B125		Screw, 3 x 5 mm Set
21	B120A		Screw, 3 x 8 mm
22	B121		Bracket Assembly, Pinch Lock
23	B151		Cam, Link
24	B152		Spring, Pinch Lock
25	B126		Bracket, Slack Switch
26	S656B		Screw, 2.6 x 6 mm
27	B123	70321513	Lever Assembly, Slack Switch
28	B124	70351483	Spring, Slack Lever
29	B123C	70394075	E-Ring 2.3 mm

NOTE: Parts without Parts Number in Parts List are not available as replacement parts.

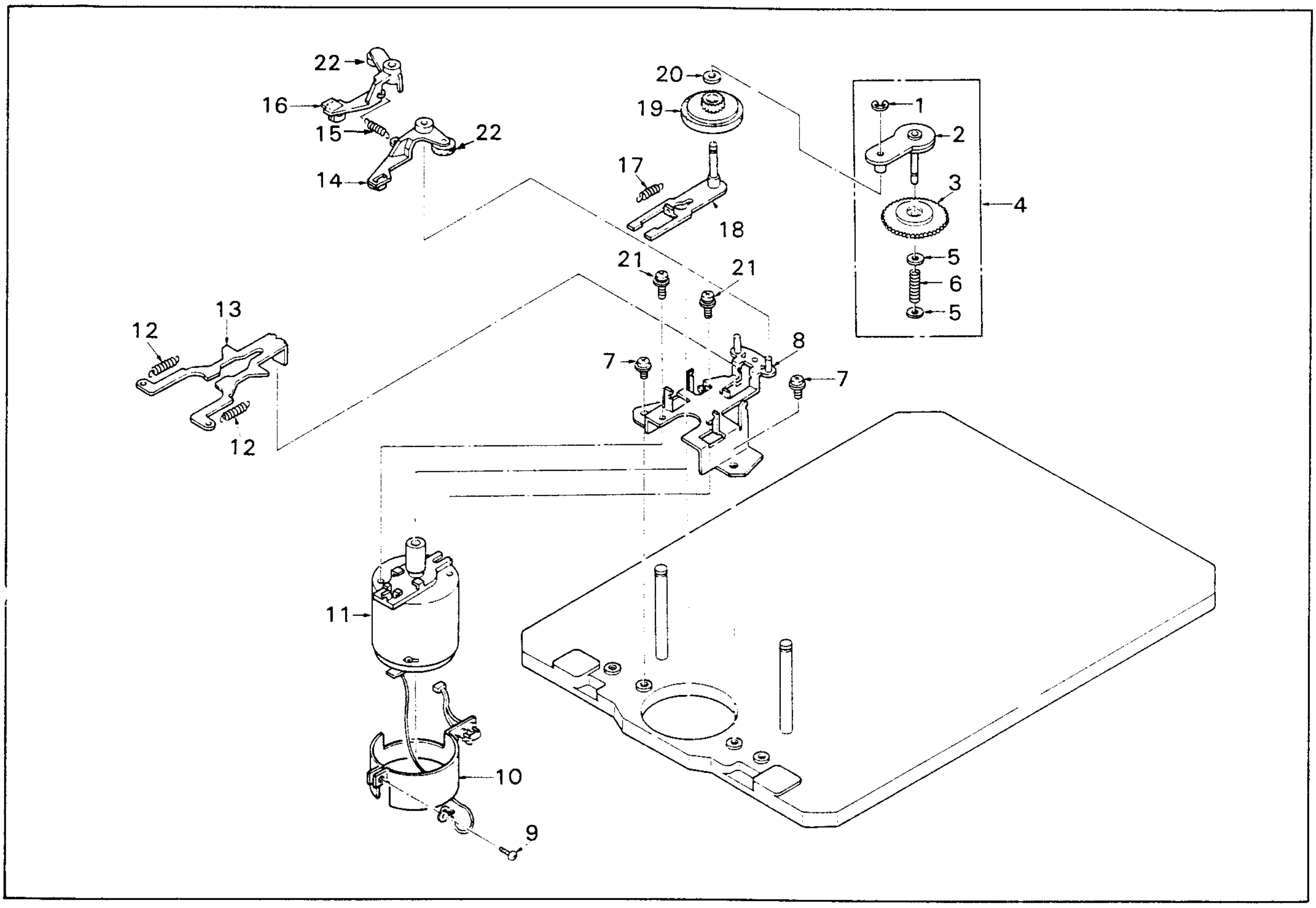
4-4. MAIN CHASSIS ASSEMBLY (RIGHT SIDE)



Key No.	Location No.	Part No.	Description
1	B605A		Screw, 3 x 10 mm
2	B181		Pinch Bracket
3	B181A		Screw, 3 x 8 mm
4	B605		Bracket, Back
5	B603		Bracket, Right
6	B607		Bracket, Left
7	K251		Opener Assembly, Cassette Compartment
8	K253		Lever, Lever Adjust
9	L661	70212003	Coil, Sensing, 0.18 MHz
10	K257		Earth Wire
11	L661A	23056200	Washer, 2 mm
12	L661B	23742020	Nut, 2 mm
13	K254		Screw, 3 x 6 mm
14	B613		Bracket, Earth
15	B613A		Screw, 3 x 10 mm
16	V205		Shield Plate
17	V205A		Screw, 3 x 0.5 x 5 mm

NOTE: Parts without Parts Number in Parts List are not available as replacement parts.

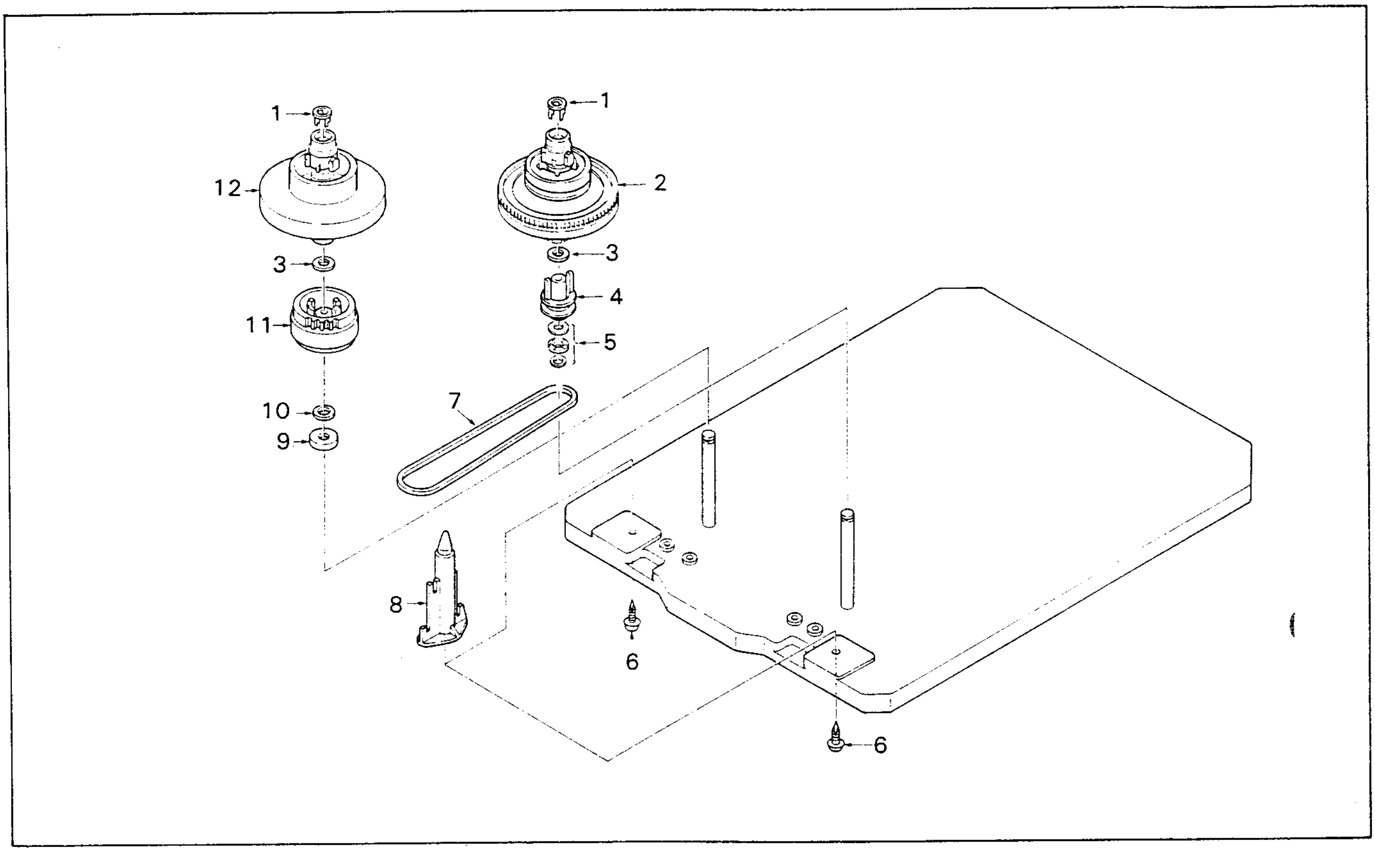
4-5. REEL MOTOR ASSEMBLY



Key No.	Location No.	Part No.	Description
1	K107	23002150	E-Ring 1.5 mm
2	K106K		Idle Holder B Assembly
3	K106P		Idle Gear
4	K106h	70326467	Clutch Assembly, Idler
5	K106R	70396003	Polyslider, 2.1 x 4.0 x 0.25 mm
6	K106Q	70351457	Spring, Clutch Torque
7	K101A		Screw, 3 x 8 mm
8	K102		Chassis Assembly, Reel Drive
9	K111C		Screw, 2.6 x 6 mm, Tapping
10	K111		Shield Assembly, Reel Motor
11	K110	70326451	Motor Assembly, Reel Drive
12	K109		Spring, Slider
13	K103		Slider
14	K105	70326432	Brake Assembly, Take Up
15	K105E		Spring, Brake
16	K104	70326431	Brake Assembly, Supply
17	K108	70351458	Spring, Idler
18	K106A		Idle Holder Assembly
19	K106D	70326449	Gear Assembly, Idler Wheel
20	K106G		Washe, Thrust
21	K110E		Screw, 2.6 x 4 mm
22	K104B	70353048	Tire, Pause Lever

NOTE: Parts without Parts Number in Parts List are not available as replacement parts.

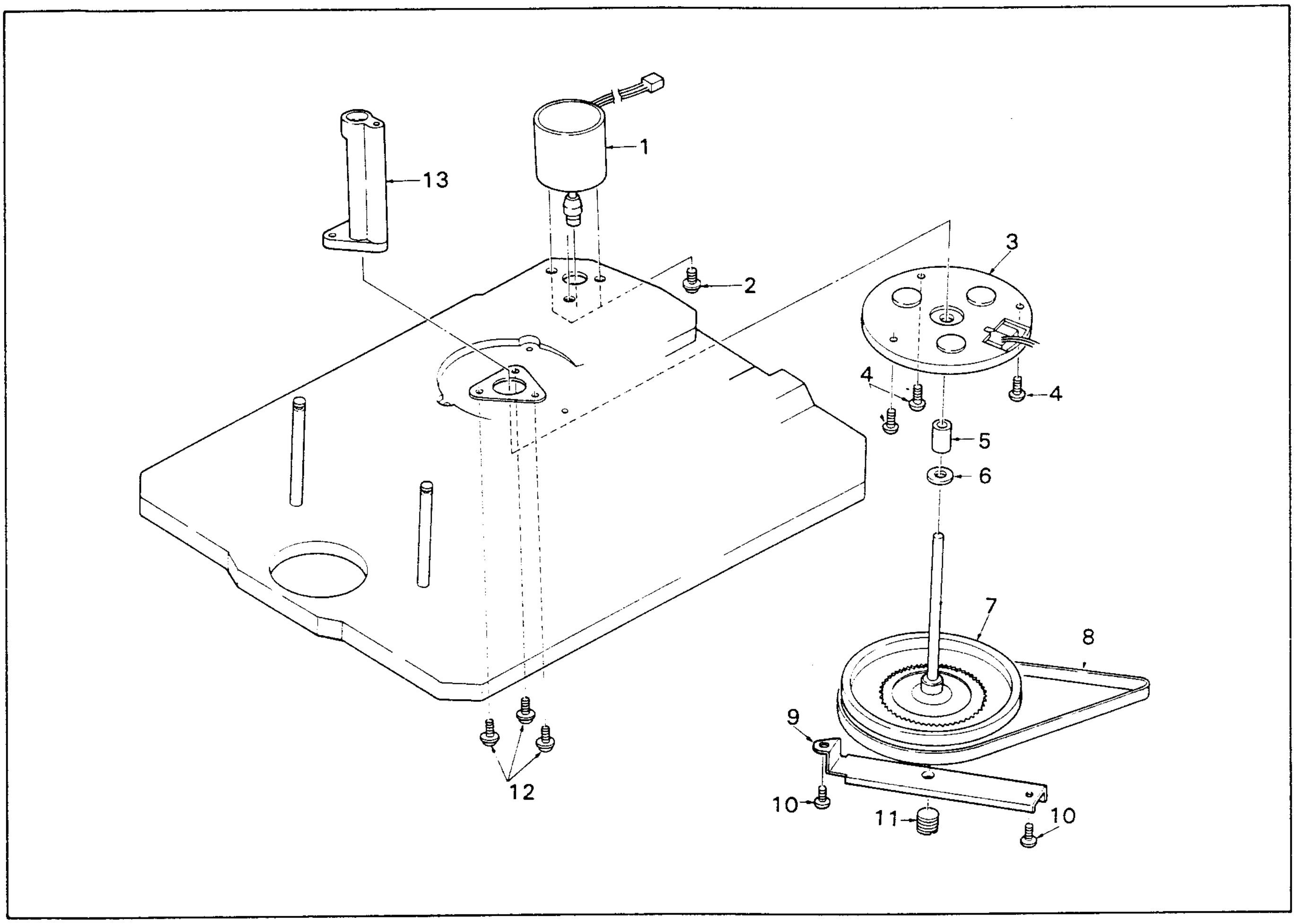
4-6. REEL CHASSIS ASSEMBLY



Key No.	Location No.	Part No.	Description
1	K173	70368001	Stopper, Reel Table
2	K171	70327058	Reel Table Assembly, Take-up
3	K154 K175	70394048	Washer, 4 x 9 x 0.2 mm
4	K172		Pulley, Reel Table
5	K170	70348028	Bearing, Thrust
6	K267		Screw, 3 x 10 mm
7	K268	70342099	Belt, Counter
8	K266		Guide Post, Cassette
9	K150	70394081	Spacer, Reel Table
10	K153		Polyslider, 4.1 x 6.5 x 0.5 mm
11	K157		Brake, Wheel
12	K151	70331094	Reel Table Assembly, Supply

NOTE: Parts without Parts Number in Parts List are not available as replacement parts.

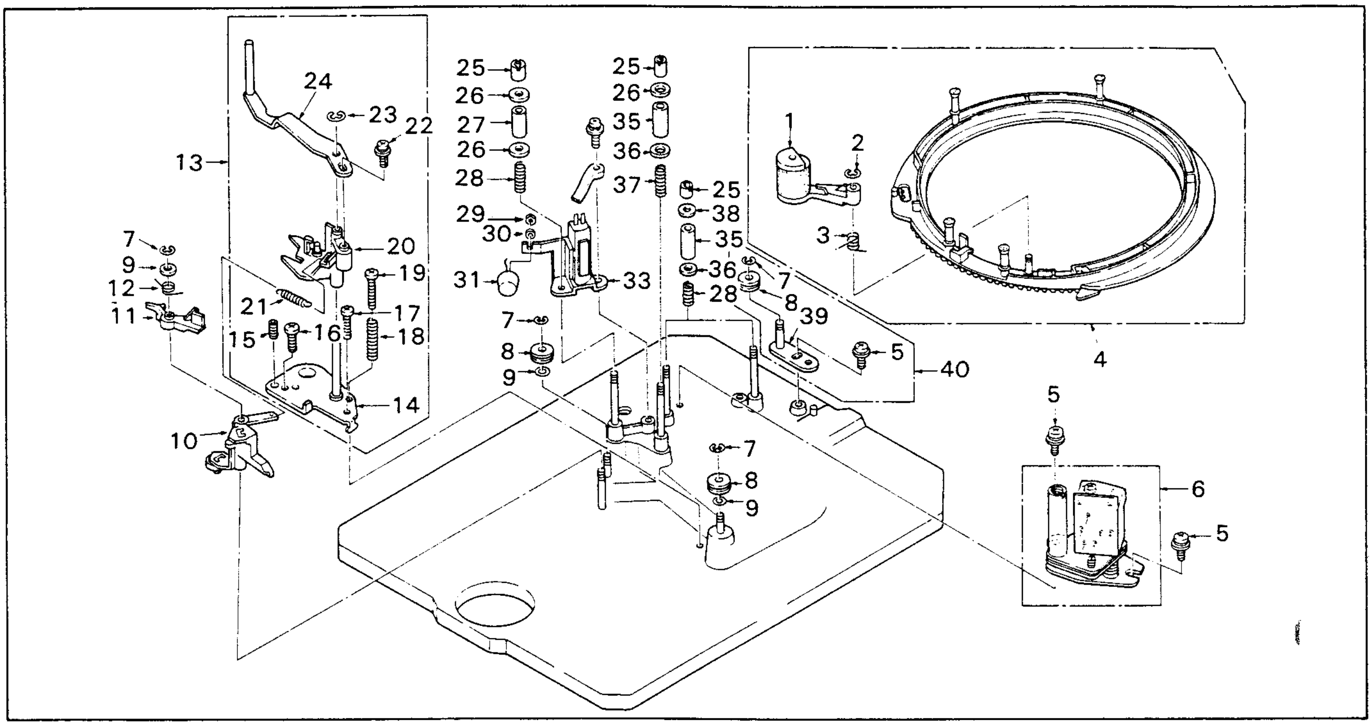
4-7. CAPSTAN DRIVE ASSEMBLY



Key No.	Location No.	Part No.	Description
1	B309	70125107	Motor Assembly, DC, Capstan
2	B309A		Screw, 2.6 x 4.6 mm
3	L551	70321672	Coil Assembly
4	B301A		Screw, 3 x 0.5 x 6 mm
5	B304D	70368004	Spacer, Capstan
6	B304E	70394018	Slider polyethylene, 3 x 7 x 0.25 mm
7	B304		Flywheel Assembly
8	B307	70342082	Belt, Flat, Capstan
9	B302		Bracket Assembly, Thrust Bearing
10	B302A		Screw, 3 x 8 mm
11	B302B		Bearing Thrust
12	G270C		Screw, 3 x 0.5 x 6 mm
13	G270		Sleeve, Capstan

NOTE: Parts without Parts Number in Parts List are not available as replacement parts.

4-8. MAIN BASE ASSEMBLY

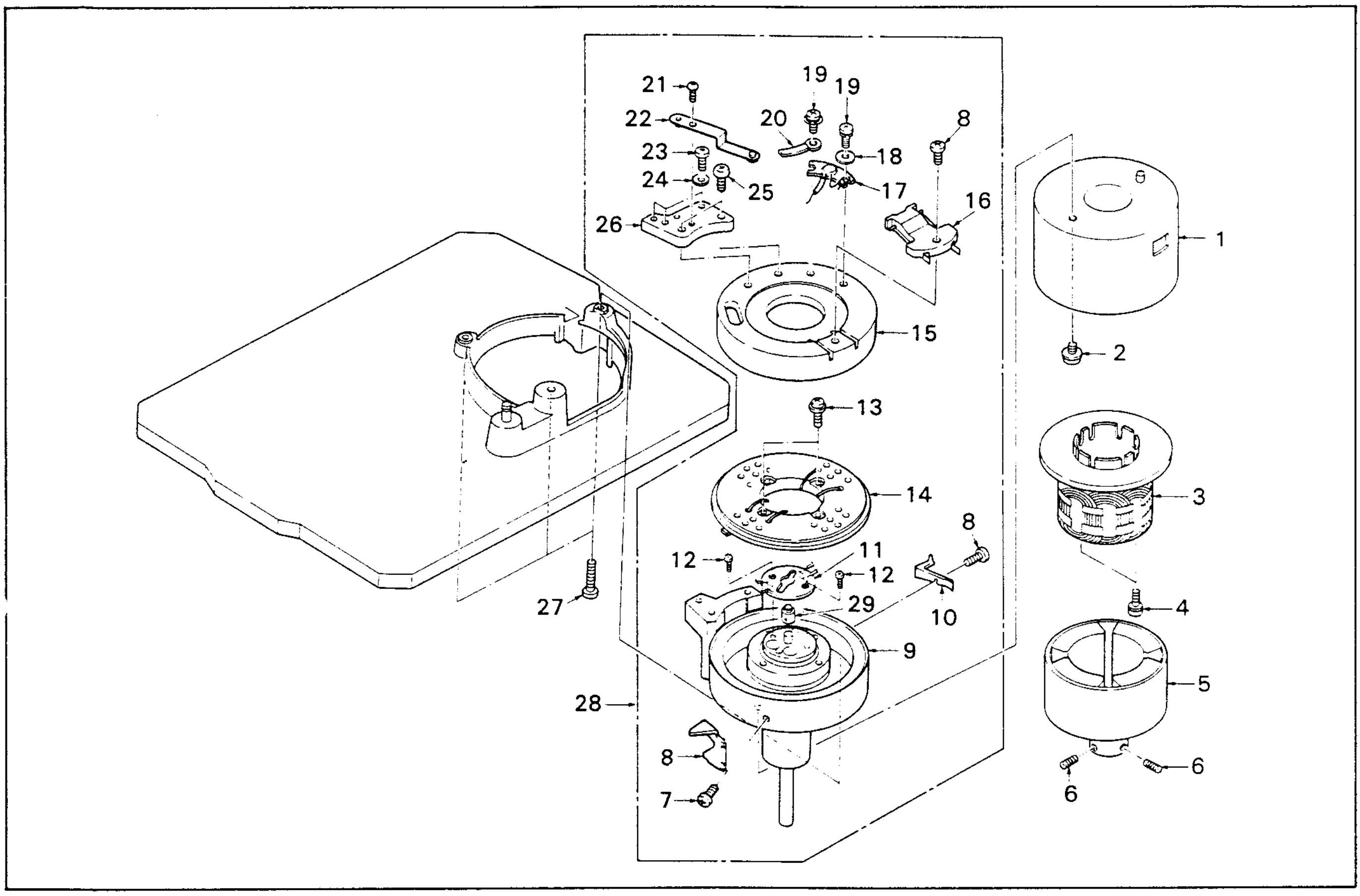


Key No.	Location No.	Part No.	Description
1	B404		Level Assembly, Pinch Roller
2	B408	23002200	E-Ring, 2 mm
3	B403	70351263	Spring, Pinch Roller
4	B401	70312083	Loading Disk Assembly
5	G202A		Screw, 3 x 8 mm
6	G202	70321557	Guide Assembly, Exit
7	G275E	70394075	E-Ring, 2.3 mm
8	G276		Roller, Disk Guide
9	B108A		Polyslider, 3.1 x 5.4 x 0.5 mm
10	B105	70321449	Tension Sub Arm Assembly
11	B107		Lever, Arm Shift
12	B108		Spring, Arm Shift Lever
13	B101		Tension Servo Assembly
14	B104		Tension Bracket Assembly
15	B104C		Screw, 3 x 6 mm
16	B101E		Screw, 3 x 0.5 x 5 mm
17	B101A		Screw, 3 x 0.5 x 10 mm
18	B101B		Spring, Adjust
19	B101C		Screw, 3 x 0.5 x 20 mm
20	B103		Tennsion Lever
21	B106	70351316	Spring, Tension

Key No.	Location No.	Part No.	Description
22	B102C		Screw, 3 x 10 mm, Tapping
23	B103A		E-Ring, 3 mm
24	B102	70321447	Tension Arm Assembly
25	G259		Nut
26	G256		Flange, First Guide
27	G251		Guide, Pole, First
28	G260		Spring, Tape Exit Guide
29	L662A		Nut, 2 mm
30	L662B		Washer, 2 mm
31	L662	70212003	Coil, Sensing, 0.18 mm
32	H032B		Lead Holder
33	H032	70183012	Head Assembly, Full Erase
34	H032A		Screw, 3 x 12 mm
35	G261		Guide Pole, Entrance
36	G263		Flange, Exit Guide, Lower
37	G253		Spring, Second Guide
38	G262		Flange, Exit Guide
39	G275A		Bracket, Roller Bracket
40	G275		Roller Assembly, Disk Guide

NOTE: Parts without Parts Number in Parts List are not available as replacement parts.

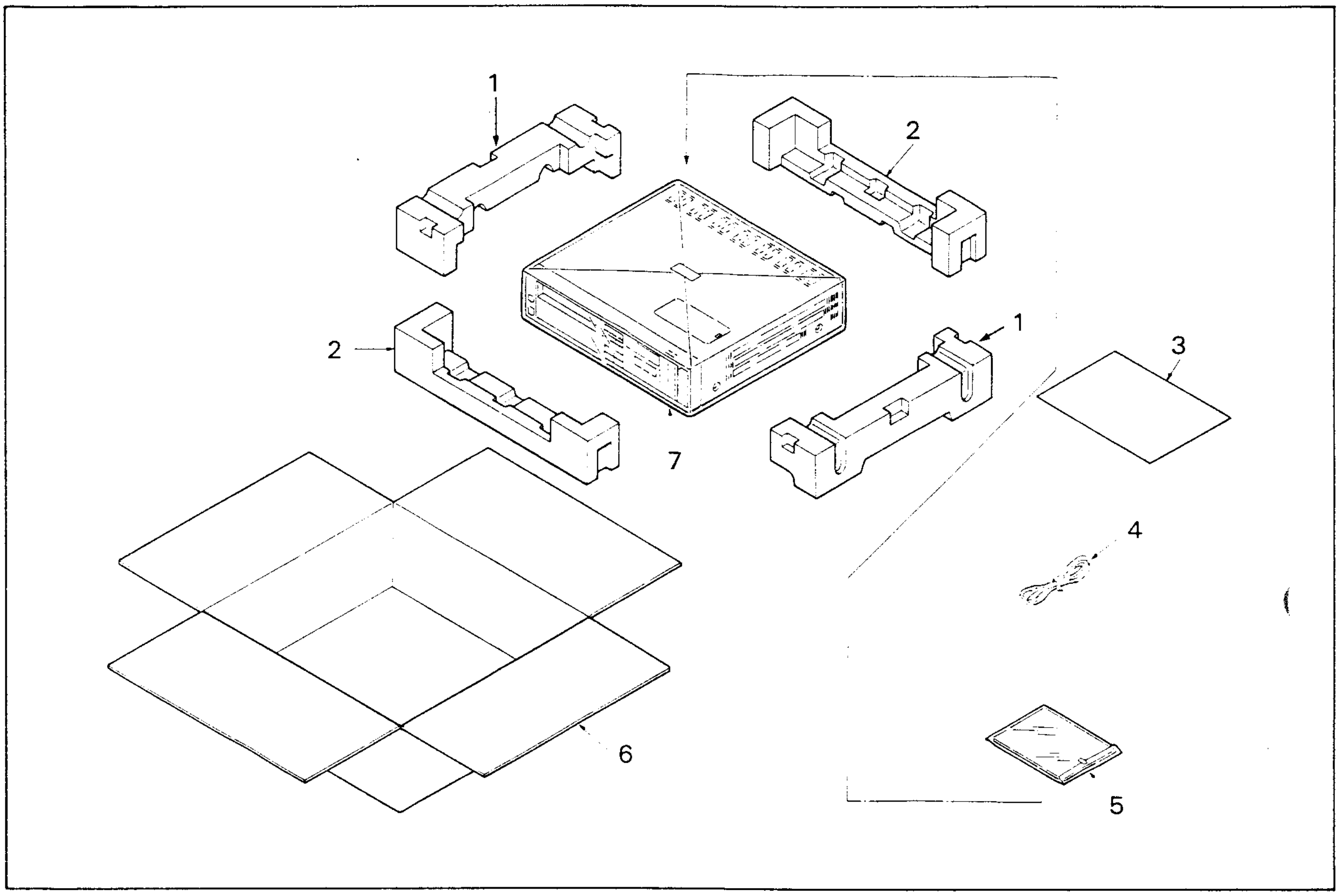
4-9. CYLINDER ASSEMBLY



Key No.	Location No.	Part No.	Description
1	G153		Shield, Case Assembly
2	G153A		Screw, 3 x 6 mm
3	G152	70125104	Starter
4	G152A		Screw, 2 x 5 mm
5	G151	70125103	Rotor Assembly
6	G151A		Screw, 4 x 6 mm
7	G137C		Screw, 3 x 0.5 x 6 mm
8	G137		Tape Holder B
9	G101	70321544	Lower Cylinder
10	G136		Tape Holder A
11	G110	70193220	PC Board Assembly, Relay
12	G110A		Screw, 2.6 x 5 mm
13	G120A	70391046	Screw, 3 x 8 mm, W/Washer
14	G120	70321542	Video Head Assembly
15	G131	70321343	Upper Cylinder
16	G132	70321232	Tape Holder Assembly
17	RL92	70213074	Dew Heater
18	RL92E		Washer
19	G132A		Screw, 3 x 8 mm
20	RL92C		Lead Holder
21	G133H		Screw, 2.6 x 4 mm
22	G133D	70321596	Spring, Brush
23	G133B		Screw, 3 x 0.5 x 10 mm
24	G133C		Washer, 3 mm
25	G133A		Screw, 4 x 8 mm
26	G133		Bracket
27	G001A		Screw, 3 x 10 mm
28	G011	70311144	Cylinder Assembly
29	G105E		Cap Assembly

NOTE: Parts without Parts Number in Parts List are not available as replacement parts.

4-12. PACKING ASSEMBLY



Key No.	Location No.	Part No.	Description
1	A702	70921099	Packing, TOP
2	A703	70921098	Packing Bottom
3	Y102	70942100	Sheet, Caution
4	Y104	70168035	PAL/SECAM Type Cable
5	Y101	70941333	Owners Manual
	Y103	70942237	Quick Reference
6	A701	70913209	Carton Box
7	A705		Sheet, Cover

NOTE: Parts without Parts Number in Parts List are not available as replacement parts.

SECTION 5. ELECTRICAL PARTS LIST

ABBREVIATIONS: Capacitors.........CD: Ceramic Disk, PF: Plastic Film, EL: Electrolytic.
Resistors..........CF: Carbon Film, CC: Carbon Composition, MF: Metal Film,
OMF: Oxide Metal Film, VR: Variable Resistors.
(All CD and PF capacitors are ±5%, 50V and all resistor, ±5%, 1/8W unless otherwise.)

NOTE: Many electrical and mechanical parts in this chassis have special safety-related characteristics. The characteristics are often passed unnoticed by a visual inspection and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this manual and its supplements, electrical components having such features are identified by ⚠mark in the schematic diagram. Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts which do not have the same safety characteristics as specified in the parts list may create shock, fire or other hazards.

LOCATION NUMBER	PART NUMBER	DESCRIPTION
	CAPACITORS	
U001 PIF. SELECTOR & POWER 2 PW UNIT 70191959		
C001, C002 C003, C004	24232103	CD, 0.01μF, +80%, −20%
C005	24232102	CD, 1000pF, +80%, −20%
C006	24636478	EL, 0.47μF, 50V
C007, C008	24436020	CD, 2pF, ±0.25pF
C009	24436120	CD, 12pF
C010	24633470	EL, 47μF, 16V
C011	24232103	CD, 0.01μF, +80%, −20%
C012, C013	24636339	EL, 3.3μF, 50V
C014	24636479	EL, 4.7μF, 50V
C015	24633471	EL, 470μF, 16V
C016, C017	24436470	CD, 47pF
C018	24232103	CD, 0.01μF, +80%, −20%
C019	24636100	EL, 10μF, 50V
C020	24340360	CD, 36pF
C021	71591682	PF, 680pF
C022	24636100	EL, 10μF, 50V
C023	24232103	CD, 0.01μF, +80%, −20%
U201 VIDEO & AUDIO PW UNIT 70191943		
C101	24232103	CD, 0.01μF, +80%, −20%
C102	24636010	EL, 1μF, 50V
C103	24633470	EL, 47μF, 16V
C104	24232103	CD, 0.01μF, +80%, −20%
C107	24636010	EL, 1μF, 50V
C108	24232103	CD, 0.01μF, +80%, −20%
C109	24636010	EL, 1μF, 50V
C110	24232103	CD, 0.01μF, +80%, −20%
C111	24436101	CD, 100pF
C112	24232103	CD, 0.01μF, +80%, −20%
C113	24632220	EL, 22μF, 10V
C114	24232103	CD, 0.01μF, +80%, −20%
C115	24632470	EL, 47μF, 10V
C116	24232103	CD, 0.01μF, +80%, −20%
C117	24436331	CD, 330pF
C118, C119	24232103	CD, 0.01μF, +80%, −20%
C120	24632220	EL, 22μF, 10V
C121, C122 C123, C124	24232103	CD, 0.01μF, +80%, −20%
C125	24436471	CD, 470pF
C126	24636010	EL, 1μF, 50V
C127	24436241	CD, 240pF
C128	24436560	CD, 56pF
C129	24232103	CD, 0.01μF, +80%, −20%
C201	24633220	EL, 22μF, 16V
C203	24436821	CD, 820pF
C204	24633100	EL, 10μF, 16V
C205	24636010	EL, 1μF, 50V
C206	24632220	EL, 22μF, 10V
C207	24436181	CD, 180pF
C208	24436150	CD, 15pF
C209	24353121	CD, 120pF
C210	24436331	CD, 330pF
C211, C212	24232103	CD, 0.01μF, +80%, −20%
C213	24632470	EL, 47μF, 10V
C214	24232103	CD, 0.01μF, +80%, −20%
C215	24632470	EL, 47μF, 10V
C216	24232103	CD, 0.01μF, +80%, −20%
C217	24436391	CD, 390pF
C218	24436151	CD, 150pF
C219	24232103	CD, 0.01μF, +80%, −20%
C220	71591473	PF, 0.47μF
C221	24632220	EL, 22μF, 10V
C222, C223	24538104	PF, 0.1μF
C224	24636478	EL, 0.47μF, 50V
C225	24436390	CD, 39pF
C226	24633100	EL, 10μF, 16V
C227	24633470	EL, 47μF, 16V
C228	24232103	CD, 0.01μF, +80%, −20%
C229	24632101	EL, 100μF, 10V
C230	24632470	EL, 47μF, 10V
C231	24632101	EL, 100μF, 10V
C232	24631471	EL, 470μF, 6.3V
C233	24436510	CD, 51pF
C234	24212102	CD, 1000pF, ±10%
C235	24538274	PF, 0.27μF
C236	24632470	EL, 47μF, 10V
C237	71591223	PF, 0.022μF

LOCATION NUMBER	PART NUMBER	DESCRIPTION
C238	24632220	EL, 22μF, 10V
C239	24436680	CD, 68pF
C240	24436820	CD, 82pF
C241	24631221	EL, 220μF, 6.3V
C242	24632220	EL, 22μF, 10V
C243	24436390	CD, 39pF
C244	24436821	CD, 820pF
C245	24436181	CD, 180pF
C246	24232103	CD, 0.01μF, +80%, −20%
C247	24436271	CD, 270pF
C248	24633470	EL, 47μF, 16V
C249	24232103	CD, 0.01μF, +80%, −20%
C261	24436150	CD, 15pF
C262	24633100	EL, 10μF, 16V
C267	24232103	CD, 0.01μF, +80%, −20%
C301	24636010	EL, 1μF, 50V
C302	24598511	PF, 510pF
C304	24436201	CD, 200pF
C305	24636478	EL, 0.47μF, 50V
C306	71591122	PF, 1200pF
C307	24436331	CD, 330pF
C308	71591393	PF, 0.039μF
C309	24436511	CD, 510pF
C311	71591152	PF, 1500pF
C312	71591122	PF, 120pF
C313	24632470	EL, 47μF, 10V
C315	24632220	EL, 22μF, 10V
C401, C402	24232103	CD, 0.01μF, +80%, −20%
C403	71591473	PF, 0.47μF
C404	24436101	CD, 100pF
C405	24632470	EL, 47μF, 10V
C407	24436200	CD, 20pF, ±0.25pF
C408	24436101	CD, 100pF
C409	24436331	CD, 330pF
C410	24436101	CD, 100pF
C411	24636010	EL, 1μF, 50V
C412	24232103	CD, 0.01μF, +80%, −20%
C413	24436560	CD, 56pF
C414	24232223	CD, 0.022μF, +80%, −20%
C415	24636479	EL, 4.7μF, 50V
C416	71591392	PF, 3900pF
C417	24636010	EL, 1μF, 50V
C418	24356390	CD, 39pF
C419	24232223	CD, 0.022μF, +80%, −20%
C420	71591223	PF, 0.22μF
C421	24636010	EL, 1μF, 50V
C422	24636010	EL, 1μF, 50V
C423	24232103	CD, 0.01μF, +80%, −20%
C424	24436101	CD, 100pF
C425, C426	24232103	CD, 0.01μF, +80%, −20%
C427	24634100	EL, 10μF, 25V
C428	24636010	EL, 1μF, 50V
C429	24436101	CD, 100pF
C430	24634100	EL, 10μF, 25V

LOCATION NUMBER	PART NUMBER	DESCRIPTION
C431	24436560	CD, 56pF
C432	24436241	CD, 240pF
C433	71591104	PF, 0.1μF
C434	24353470	CD, 47pF
C435	24353160	CD, 16pF
C436	24353680	CD, 68pF
C437	24353680	CD, 68pF
C438	24632470	EL, 47μF, 10V
C439	24232223	CD, 0.022μF, +80%, −20%
C440	24632470	EL, 47μF, 10V
C442	24436620	CD, 62pF
C443	24436360	CD36pF
C444, C445 C446	24232103	CD, 0.01μF, +80%, −20%
C447	24436560	CD, 56pF
C448	24436511	CD, 510pF
C449	24232103	CD, 0.01μF, +80%, −20%
C451	70417014	Trimmer, 8p
C461, C462	24232103	CD, 0.01μF, +80%, −20%
C464	71591122	PF, 1200pF
C465	24212102	CD, 1000pF, ±10%
C466	24636339	EL, 3.3μF, 50V
C467	24212332	CD, 3300pF
C468	24436680	CD, 68pF
C469, C470 C471	24232103	CD, 0.01μF, +80%, −20%
C472	24633100	EL, 10μF, 16V
C473	24436331	CD, 330pF

U501 SEERVO & LOGIC PW UNIT 70191944

C501, C502	24632470	EL, 47μF, 10V
C503	24436101	CD, 100pF
C507	24436221	CD, 220pF
C508, C509	71591562	PF, 5600pF
C510	71591272	PF, 2700pF
C511	71591272	PF, 2700pF
C512	71591393	PF, 0.039μF
C513	24636010	EL, 1μF, 50V
C514, C515	24633220	EL, 22μF, 16V
C516	24633100	EL, 10μF, 16V
C517	24633220	EL, 22μF, 16V
C518, C519	71591103	PF, 0.01μF
C520, C521	24340471	CD, 220pF
C522	24353390	CD, 39μF
C523	71591103	PF, 0.01μF
C524	24356151	CD, 150pF
C525	24356300	CD, 30pF
C526, C527	71591103	PF, 0.01μF
C528	24232103	CD, 0.01μF, +80%, −20%
C529	24633220	EL, 22μF, 16V
C530	24636229	EL, 2.2μF, 50V
C531	24232103	CD, 0.01μF, +80%, −20%
C532, C533	24632470	EL, 47μF, 10V
C534	24232103	CD, 0.01μF, +80%, −20%

LOCATION NUMBER	PART NUMBER	DESCRIPTION
C535	24633100	EL, 10μF, 16V
C536	71591103	PF, 0.01μF
C537	24636229	EL, 2.2μF, 50V
C538	71591103	PF, 0.01μF
C539	71591102	PF, 0.01μF
C540	24232103	CD, 0.01μF, +80%, −20%
C541	24085023	EL, 1μF, 16V
C542	24232103	CD, 0.01μF, +80%, −20%
C601	24632470	EL, 47μF, 10V
C602	24232103	CD, 0.01μF, +80%, −20%
C603	24632101	EL, 100μF, 10V
C604	24632470	EL, 47μF, 10V
C605	24634101	EL, 100μF, 25V
C607	24436101	CD, 100pF
C608	24436910	CD, 91pF
C610	24232103	CD, 0.01μF, +80%, −20%
C611	24867392	PF, 3900pF
C612	71593223	PF, 0.022μF
C613	24867392	PF, 3900pF
C614	71593223	PF, 0.022μF
C615	24232223	CD, 0.022μF, +80%, −20%
C616	24632220	EL, 22μF, 10V
C617	24636229	EL, 2.2μF, 50V
C618	24632470	EL, 47μF, 10V
C619, C620	24232103	CD, 0.01μF, +80%, −20%
C630	24632220	EL, 22μF, 10V
C631	24232103	CD, 0.01μF, +80%, −20%
C633	71592333	PF, 0.033μF
C634	24636229	EL, 2.2μF, 50V
C637	24632470	EL, 47μF, 10V
C640	24632470	EL, 47μF, 10V
C642	71592682	PF, 6800pF
C643	24232103	CD, 0.01μF, +80%, −20%
C644	24632470	EL, 47μF, 10V
C645	24212221	CD, 220pF, ±10%
C646	71592272	PF, 2700pF
U201 VIDEO & AUDIO PW UNIT 70191943		
C701	24633100	EL, 10μF, 16V
C702	24212152	CD, 1500pF, ±10%
C703	24633101	EL, 100μF, 16V
C704	24633100	EL, 10μF, 16V
C705	24432101	CD, 100pF, ±10%
C706	71591273	PF, 0.27μF
C708	24632101	EL, 100μF, 10V
C709	24636478	EL, 0.47μF, 50V
C710	24633100	EL, 10μF, 16V
C711	24635479	EL, 4.7μF, 35V
C712	24633220	EL, 22μF, 16V
C713	24211562	CD, 560pF
C714	24636478	EL, 0.47μF, 50V
C715	24212102	CD, 1000pF, ±10%
C716	24635479	EL, 4.7μF, 35V
C717	24432101	CD, 100pF, ±10%

LOCATION NUMBER	PART NUMBER	DESCRIPTION
C718	24635339	EL, 3.3μF, 35V
C719	24212821	CD, 820pF, ±10%
C720, C721	24633100	EL, 10μF, 16V
C722	24633221	EL, 220μF, 16V
C724	24635479	EL, 4.7μF, 35V
C725	24212102	CD, 1000pF, ±10%
C726	24867682	PF, 6800pF
C727	24633470	EL, 47μF, 16V
C728	24212472	CD, 4700pF, ±10%
C729	24214221	CD, 220pF, ±10%, 500V
C730	24538124	PF, 0.12μF
C731	24232103	CD, 0.01μF, +80%, −20%
U801 POWER PW UNIT 70191945		
△C801	24098011	PF, 0.1μF, 250V AC
C802, C803	24232103	CD, 0.01μF, +80%, −20%
C804, C805 C806	70415069	EL, 35V
C807	24634220	EL, 22μF, 25V
C808	24232103	CD, 0.01μF, +80%, −20%
C809	24633100	EL, 10μF, 16V
C810	24634100	EL, 10μF, 25V
C811	24633100	EL, 10μF, 16V
C812	24633102	EL, 1000μF, 16V
C813	24633222	EL, 2200μF, 16V
C814	24633100	EL, 10μF, 16V
C815, C816	24641100	EL, 10μF, 100V
C817, C818	71591104	PF, 0.1μF
U001 PIF. SELECTOR & POWER 2 PW UNIT 70191959		
C861	24641101	EL, 100μF, 100V
C863, C864	24641100	EL, 10μF, 100V
C865	24641101	EL, 100μF, 100V
C866	24636101	EL, 100μF, 50V
CA01	24232103	CD, 0.01μF, +80%, −20%
CA02	24636100	EL, 10μF, 50V
UX01 TIMER & LOGIC CONTROL PW UNIT 70191946		
CX01	24634470	EL, 47μF, 25V
CX02	24633100	EL, 10μF, 16V
CX03	24632470	EL, 47μF, 10V
CX04	24632331	EL, 330μF, 10V
CX05, CX06 CX07	24232103	CD, 0.01μF, +80%, −20%
CX08	24232223	CD, 0.022μF, +80%, −20%
CX09, CX10	24436101	CD, 100pF

RESISTERS

U001 PIF. SELECTOR & POWER 2 PW UNIT 70191959		
R001	24360101	CF, 100 ohm
R002	24360301	CF, 300 ohm

LOCATION NUMBER	PART NUMBER	DESCRIPTION
R003	24360562	CF, 5.6k ohm
R004	24360471	CF, 470 ohm
R005	24360102	CF, 1k ohm
R006	24360270	CF, 27 ohm
R007	24360821	CF, 820 ohm
R008	24360392	CF, 3.9k ohm
R009	24360683	CF, 68k ohm
R010	24360221	CF, 220 ohm
R011	24360824	CF, 820k ohm
R012	24360152	CF, 1.5k ohm
R013	24360511	CF, 510 ohm
R014	24360681	CF, 680 ohm
R015	24360102	CF, 1k ohm
R016	24941821	CC, 820 ohm, 1/4W
R017, R018	24360102	CF, 1k ohm
R019	24360153	CF, 15k ohm
R020	24360242	CF, 2.4k ohm
R021	24360182	CF, 1.8k ohm
R022	24360104	CF, 100k ohm
R023	24360104	CF, 100k ohm
R024	24360474	CF, 470k ohm
R025	24360103	CF, 10k ohm
R026	24360563	CF, 56k ohm
R027	24360103	CF, 10k ohm
R028	24360563	CF, 56k ohm
R029	24360103	CF, 10k ohm
R030	24360363	CF, 36k ohm
R031	24360154	CF, 150k ohm
R032	24360103	CF, 10k ohm
R033	24360563	CF, 56k ohm
R051	24061149	VR, 330k ohm, 0.15W
R052	24061138	VR, 4.7k ohm, 0.15W
R064	24360105	CF, 1M ohm
U201 VIDEO & AUDIO PW UNIT 70191943		
R101, R102	24360620	CF, 62 ohm
R103	24360681	CF, 680 ohm
R104	24360301	CF, 300 ohm
R105	24360472	CF, 4.7k ohm
R106	24360102	CF, 1k ohm
R107	24360133	CF, 13k ohm
R108	24360393	CF, 39k ohm
R109	24360471	CF, 470 ohm
R110	24360332	CF, 3.3k ohm
R111	24360433	CF, 43k ohm
R113	24360102	CF, 1k ohm
R114, R115 R116, R117	24360104	CF, 100k ohm
R118, R119	24360182	CF, 1.8k ohm
R120	24360332	CF, 3.3k ohm
R121, R122	24360152	CF, 1.5k ohm
R123	24360471	CF, 470 ohm
R124	24360103	CF, 10k ohm
R125	24360333	CF, 33k ohm

LOCATION NUMBER	PART NUMBER	DESCRIPTION
R126	24360122	CF, 1.2k ohm
R127	24360132	CF, 1.3k ohm
R128	24360821	CF, 820 ohm
R129, R130	24360102	CF, 1k ohm
R131, R132	24360391	CF, 390 ohm
R133	24360821	CF, 820 ohm
R134	24360223	CF, 22k ohm
R135	24360103	CF, 10k ohm
R136	24360681	CF, 680 ohm
R137	24360331	CF, 330 ohm
R138, R139	24360103	CF, 10k ohm
R140	24360223	CF, 22k ohm
R141	24360102	CF, 1k ohm
R142	24360243	CF, 24k ohm
R143	24360153	CF, 15k ohm
R144	24360152	CF, 1.5k ohm
R145	24360101	CF, 100 ohm
R151, R152	70421198	VR, 2.2k ohm, 0.1W
R201	24360274	CF, 270k ohm
R202	24360152	CF, 1.5k ohm
R203	24360121	CF, 120 ohm
R204	24360622	CF, 6.2k ohm
R205	24360271	CF, 270 ohm
R206	24360152	CF, 1.5k ohm
R207	24360182	CF, 1.8k ohm
R208	24360160	CF, 16 ohm
R209	24360153	CF, 15k ohm
R210	24378223	CF, 22k ohm, ±2%
R211	24360302	CF, 3k ohm
R212	24378912	CF, 9.1k ohm, ±2%
R213	24378392	CF, 3.9k ohm, ±2%
R214	24378242	CF, 2.4k ohm, ±2%
R217, R218	24360273	CF, 27k ohm
R219	24360274	CF, 270k ohm
R220	24360101	CF, 100 ohm
R221	24360821	CF, 820 ohm
R222	24360241	CF, 240 ohm
R223	24360302	CF, 3k ohm
R224	24360471	CF, 470 ohm
R225	24360390	CF, 39 ohm
R256	24360182	CF, 1.8k ohm
R227	24360820	CF, 82 ohm
R228	24360390	CF, 39 ohm
R229	24360182	CF, 1.8k ohm
R230	24360243	CF, 24k ohm
R231	24360182	CF, 1.8k ohm
R232	24360274	CF, 270k ohm
R233	24360332	CF, 3.3k ohm
R234	24360102	CF, 1k ohm
R235	24360621	CF, 620 ohm
R236, R237	24378102	CF, 1k ohm, ±2%
R238, R239	24360102	CF, 1k ohm
R240	24360622	CF, 6.2k ohm
R241	24360103	CF, 10k ohm

LOCATION NUMBER	PART NUMBER	DESCRIPTION
R242	24360472	CF, 4.7k ohm
R243	24360471	CF, 470 ohm
R244	24360102	CF, 1k ohm
R245	24360562	CF, 5.6k ohm
R246	24360101	CF, 100 ohm
R247	24360151	CF, 150 ohm
R248	24378680	CF, 68 ohm, ±2%
R249	24378910	CF, 91 ohm, ±2%
R251	70421199	VR, 3.3k ohm, 0.1W
R252	70421198	VR, 2.2k ohm, 0.1W
R253	70421199	VR, 3.3k ohm, 0.1W
R261	24360390	CF, 39 ohm
R262	24360229	CF, 2.2 ohm
R264	24360620	CF, 62 ohm
R265	24360203	CF, 20k ohm
R266	24360473	CF, 47k ohm
R267	24360914	CF, 910k ohm
R268	24360102	CF, 1k ohm
R269	24360473	CF, 47k ohm
R270	24360243	CF, 24k ohm
R271	24360332	CF, 3.3k ohm
R272	24360333	CF, 33k ohm
R273	24360133	CF, 13k ohm
R274, R275	24360561	CF, 560 ohm
R276	24360182	CF, 1.8k ohm
R277	24360102	CF, 1k ohm
R278	24360561	CF, 560 ohm
R279	24360911	CF, 910 ohm
R280	24360151	CF, 150 ohm
R281	24360331	CF, 330 ohm
R282	24378223	CF, 22k ohm, ±2%
R283	24378153	CF, 15k ohm, ±2%
R284	24378152	CF, 1.5k ohm, ±2%
R285	24378182	CF, 1.8k ohm, ±2%
R286	24360160	CF, 16 ohm
R287	24360153	CF, 15k ohm
R288	24360271	CF, 270 ohm
R289	24360151	CF, 150 ohm
R290	24360821	CF, 820 ohm
R291	24360331	CF, 330 ohm
R292	24360272	CF, 2.7k ohm
R293, R294	24360153	CF, 15k ohm
R295	24378331	CF, 330 ohm, ±2%
R296	24378102	CF, 1k ohm, ±2%
R297	24378112	CF, 1.1k ohm, ±2%
R298	24360183	CF, 18k ohm
R299	24360512	CF, 5.1k ohm
R300	24360222	CF, 2.2k ohm
R301	24378181	CF, 180 ohm, ±2%
R302	24360101	CF, 100 ohm
R303	24360563	CF, 56k ohm
R304	24360102	CF, 1k ohm
R305	24360273	CF, 27k ohm
R309	24360182	CF, 1.8k ohm

LOCATION NUMBER	PART NUMBER	DESCRIPTION
R310	24360222	CF, 2.2k ohm
R311	24360512	CF, 5.1k ohm
R312	24360184	CF, 180k ohm
R313	24360104	CF, 100k ohm
R314	24360243	CF, 24k ohm
R315	24360751	CF, 750 ohm
R316	24360202	CF, 2k ohm
R317	24360222	CF, 2.2k ohm
R319	24360153	CF, 15k ohm
R320	24360204	CF, 200k ohm
R401	24360132	CF, 1.3k ohm
R402	24360102	CF, 1k ohm
R403	24360912	CF, 9.1k ohm
R404	24360472	CF, 4.7k ohm
R405	24360391	CF, 390 ohm
R406	24360182	CF, 1.8k ohm
R407, R408 R409, R410	24360391	CF, 390 ohm
R411	24360242	CF, 2.4k ohm
R412	24360561	CF, 560 ohm
R413	24360182	CF, 1.8k ohm
R414	24360103	CF, 10k ohm
R415	24360511	CF, 510 ohm
R416	24378151	CF, 150 ohm, ±2%
R417	24360561	CF, 560 ohm
R418	24360332	CF, 3.3k ohm
R419	24360362	CF, 3.6k ohm
R420	24360333	CF, 33k ohm
R421	24378272	CF, 2.7k ohm, ±2%
R422	24360472	CF, 4.7k ohm
R423	24378152	CF, 1.5k ohm, ±2%
R424	24360914	CF, 910k ohm
R425	24360512	CF, 5.1k ohm
R426	24360333	CF, 33k ohm
R428	24360332	CF, 3.3k ohm
R429	24360102	CF, 1k ohm
R430	24360911	CF, 910 ohm
R431	24360152	CF, 1.5k ohm
R432	24360561	CF, 560 ohm
R433	24360332	CF, 3.3k ohm
R434	24360511	CF, 510 ohm
R436	24360132	CF, 1.3k ohm
R437	24360511	CF, 510 ohm
R438	24360751	CF, 750 ohm
R439	24360203	CF, 20k ohm
R440	24360221	CF, 220 ohm
R441	24360391	CF, 390 ohm
R442	24360363	CF, 36k ohm
R443	24360202	CF, 2k ohm
R444	24360333	CF, 33k ohm
R445	24360102	CF, 1k ohm
R446	24360334	CF, 330k ohm
R447	24360562	CF, 5.6k ohm
R448	24360274	CF, 270k ohm

LOCATION NUMBER	PART NUMBER	DESCRIPTION
R449	24360434	CF, 430k ohm
R451	70421202	VR, 10k ohm, 0.1W
R452	70421199	VR, 3.3k ohm, 0.1W
R454	70421202	VR, 10k ohm, 0.1W
R455	70421203	VR, 15k ohm, 0.1W
R456	70421202	VR, 10k ohm, 0.1W
R457	70421193	VR, 330 ohm, 0.1W
R461	24360244	CF, 240k ohm
R462	24360332	CF, 3.3k ohm
R463	24360472	CF, 4.7k ohm
R464	24360473	CF, 47k ohm
R465	24360392	CF, 3.9k ohm
R466, R467 R468	24360103	CF, 10k ohm
R469	24360752	CF, 7.5k ohm
R470	24360332	CF, 3.3k ohm
R472	24360182	CF, 1.8k ohm
R473	24360754	CF, 750k ohm
R474	24360152	CF, 1.5k ohm
R475	24360182	CF, 1.8k ohm
R476	24360122	CF, 1.2k ohm
R477	24360102	CF, 1k ohm
R478, R479	24360103	CF, 10k ohm
R480	24360102	CF, 1k ohm
R481	24360223	CF, 22k ohm
R482	24360103	CF, 10k ohm
R483, R484	24360154	CF, 150k ohm
R550	70421162	VR, 500k ohm, 1/5W

U501 SERVO & LOGIC PW UNIT 70191944

LOCATION NUMBER	PART NUMBER	DESCRIPTION
R501	24360122	CF, 1.2k ohm
R502	24360911	CF, 910 ohm
R503	24360432	CF, 4.3k ohm
R504	24360102	CF, 1k ohm
R505	24360103	CF, 10k ohm
R506	24360104	CF, 100k ohm
R507, R508	24360223	CF, 22k ohm
R515	24360392	CF, 3.9k ohm
R518	24360823	CF, 82k ohm
R519	24360103	CF, 10k ohm
R520, R521	24360683	CF, 68k ohm
R522	24360474	CF, 470k ohm
R523	24360473	CF, 47k ohm
R524	24360474	CF, 470k ohm
R525	24360473	CF, 47k ohm
R526	24360182	CF, 1.8k ohm
R527	24360912	CF, 9.1k ohm
R528	24360472	CF, 4.7k ohm
R529	24360472	CF, 4.7k ohm
R530, R531	24360104	CF, 100k ohm
R532	24360472	CF, 4.7k ohm
R533	24360101	CF, 100 ohm
R534	24360223	CF, 22k ohm
R535	24360472	CF, 4.7k ohm
R536	24360333	CF, 33k ohm
R537	24360103	CF, 10k ohm
R538	24360473	CF, 47k ohm
R539	24360332	CF, 3.3k ohm
R540	24360105	CF, 1M ohm
R541	24360102	CF, 1k ohm
R542, R543	24360682	CF, 6.8k ohm
R544	24360474	CF, 470k ohm
R545	24360183	CF, 18k ohm
R546	24360123	CF, 12k ohm
R547	24360103	CF, 10k ohm
R548	24360123	CF, 12k ohm
R549	24360183	CF, 18k ohm
R551, R552	70421238	VR, 470k ohm, 0.1W
R553	70421237	VR, 330k ohm, 0.1W
R560	24360684	CF, 680k ohm
R561	24360103	CF, 10k ohm
R562	24360105	CF, 1M ohm
R563	24360103	CF, 10k ohm
R564	24360122	CF, 1.2k ohm
R565	24360563	CF, 56k ohm
R566	24360471	CF, 470 ohm
R567	24360122	CF, 1.2k ohm
R568	24360393	CF, 39k ohm
R569	24360471	CF, 470 ohm
R570, R571 R572	24360183	CF, 18k ohm
R573	24360103	CF, 10k ohm
R574	24360183	CF, 18k ohm
R575	24360103	CF, 10k ohm
R576	24360393	CF, 39k ohm
R577	24360104	CF, 100k ohm
R578	24360473	CF, 47k ohm
R579	24360472	CF, 4.7k ohm
R580	24360104	CF, 100k ohm
R581, R582	24360104	CF, 100k ohm
R583, R584	24360104	CF, 100k ohm
R585	24360154	CF, 150k ohm
R586	24360823	CF, 82k ohm
R587	24360224	CF, 220k ohm
R588	24360153	CF, 15k ohm
R589	24360823	CF, 82k ohm
R590	24360183	CF, 18k ohm
R591	24360474	CF, 470k ohm
R592	24360104	CF, 100k ohm
R593	24360122	CF, 1.2k ohm
R594	24360224	CF, 220k ohm
R595, R596	24360104	CF, 100k ohm
R597, R598	24360123	CF, 12k ohm
R599	24360473	CF, 47k ohm
R601	24360153	CF, 15k ohm
R602	24360332	CF, 3.3k ohm
R603	24360682	CF, 6.8k ohm
R604	24360153	CF, 15k ohm

LOCATION NUMBER	PART NUMBER	DESCRIPTION
R605	24360332	CF, 3.3k ohm
R606	24360682	CF, 6.8k ohm
R607, R608 R609	24360223	CF, 22k ohm
R610	24360154	CF, 150k ohm
R611	24360102	CF, 1k ohm
R613	24360103	CF, 10k ohm
R614	24360823	CF, 82k ohm
R615	24360103	CF, 10k ohm
R617	24360104	CF, 100k ohm
R618	24360223	CF, 22k ohm
R620	24360821	CF, 820 ohm
R623, R624 R625, R626 R627, R628 R629	24360103	CF, 10k ohm
R631, R632 R633	24360472	CF, 4.7k ohm
R634	24360434	CF, 430k ohm
R635	24360183	CF, 18k ohm
R636	24360154	CF, 150k ohm
R638	24360473	CF, 47k ohm
R641, R642	24360823	CF, 82k ohm
R643	24360103	CF, 10k ohm
R644	24360102	CF, 1k ohm
R645	24360121	CF, 120 ohm
R646	24360473	CF, 47k ohm
R647, R648 R649	24360473	CF, 47k ohm
R651, R652	70421243	VR, 1k ohm, Metal
R660	24360472	CF, 4.7k ohm
R661	24360103	CF, 10k ohm
R662	24360222	CF, 2.2k ohm
R663, R664	24360103	CF, 10k ohm
R665	24360472	CF, 4.7k ohm
R666	24360103	CF, 10k ohm
R667	24360681	CF, 680 ohm
R671	24360221	CF, 220 ohm
R672, R673	24360103	CF, 10k ohm
R674	24360221	CF, 220 ohm
R678	24360101	CF, 100 ohm
R681	24360153	CF, 15k ohm
R682, R683 R684, R685 R686, R687 R688	24360103	CF, 10k ohm
R689, R690	24360153	CF, 15k ohm
R691, R692	24360242	CF, 2.4k ohm
R694	24360202	CF, 2k ohm
R696	24360103	CF, 10k ohm
R699	24360183	CF, 18k ohm

U201 VIDEO & AUDIO PW UNIT 70191943

LOCATION NUMBER	PART NUMBER	DESCRIPTION
R702, R703	24360104	CF, 100k ohm
R704, R752	24360752	CF, 7.5k ohm
R706	24360202	CF, 2k ohm
R707	24360243	CF, 24k ohm
R708	24360154	CF, 150k ohm
R709	24360124	CF, 120k ohm
R710	24360562	CF, 5.6k ohm
R713, R714	24360472	CF, 4.7k ohm
R715	24360562	CF, 5.6k ohm
R716	24360563	CF, 56k ohm
R717	24360472	CF, 4.7k ohm
R718	24360473	CF, 47k ohm
R719	24360332	CF, 3.3k ohm
R720	24360243	CF, 24k ohm
R721	24360752	CF, 7.5k ohm
R722	24360103	CF, 10k ohm
R723	24360332	CF, 3.3k ohm
R724	24360242	CF, 2.4k ohm
R725	24360103	CF, 10k ohm
R726	24360912	CF, 9.1k ohm
R727	24360682	CF, 6.8k ohm
R729	24360332	CF, 3.3k ohm
R731	24360153	CF, 15k ohm
R732	24360684	CF, 680k ohm
R733	24360394	CF, 390k ohm
R735	24360102	CF, 1k ohm
R737	24360821	CF, 820 ohm
R738	24360334	CF, 330k ohm
R739	24360394	CF, 390k ohm
R740	24360105	CF, 1M ohm
R741	24360222	CF, 2.2k ohm
R742	24360272	CF, 2.7k ohm
R743	24360302	CF, 3k ohm
R744	24360752	CF, 7.5k ohm
R745	24360303	CF, 30k ohm
R752	70421200	VR, 4.7 k ohm 0.1W
R753	70421210	VR, 220k ohm 0.1W
R760	24360621	CF, 620 ohm
R761	24360229	CF, 2.2 ohm
R762	24360101	CF, 100 ohm
R763	24360153	CF, 15k ohm
⚠R764	70420013	Fusible, 4.7 ohm, 1/4W
R765	24360621	CF, 620 ohm

U801 POWER PW UNIT 70191945

LOCATION NUMBER	PART NUMBER	DESCRIPTION
R801	24360221	CF, 220 ohm
R802	24360681	CF, 680 ohm
R803	24360152	CF, 1.5k ohm
R804	24360182	CF, 1.8k ohm
R805	24360152	CF, 1.5k ohm
⚠R806	24531220	Fusible, 22 ohm, 1/2W
R807	24360471	CF, 470 ohm
R808	24360103	CF, 10k ohm
R809	24553392	OMF, 3.9k ohm, 1W
R810	24360333	CF, 33k ohm

LOCATION NUMBER	PART NUMBER	DESCRIPTION
R811	24360563	CF, 56k ohm
R812	24360103	CF, 10k ohm
R813	24552682	OMF, 6.8k ohm, 1/2W
R814	24360682	CF, 6.8k ohm
R815	24360242	CF, 2.4k ohm
R816	24360152	CF, 1.5k ohm
R817	24552151	OMF, 150 ohm, 1/2W
R818	24360152	CF, 1.5k ohm
R819	24360752	CF, 7.5k ohm
R820	24552682	OMF, 6.8k ohm, 1/2W
R821	24964151	OMF, 150 ohm, 2W
R822	24360272	CF, 2.7k ohm
R851	24061318	VR, 1k ohm, 0.15W
R852	24061322	VR, 4.7k ohm, 0.15W

U001 PIF. SELECTOR & POWER 2 PW UNIT 70191959

R861, R862 R863	24553822	OMF, 8.2k ohm, 1W
R864	24553182	OMF, 1.8k ohm, 1W
R866, R867 R868	24553682	OMF, 6.8k ohm, 1W
R869	24360103	CF, 10k ohm
R870, R871	24553472	OMF, 4.7k ohm, 1W
RA01	24360434	CF, 430k ohm
RA02	24360224	CF, 220k ohm
RA03	24360243	CF, 24k ohm
RA04	24360512	CF, 5.1k ohm
RA05	24360563	CF, 56k ohm
RA51	70421412	Potentiometer, 20k ohm × 8

UX01 TIMER & LOGIC CONTROL PW UNIT 70191946

RA81, RA82 RA83, RA84 RA85, RA86 RA87, RA88	24360512	CF, 5.1k ohm
RA89	24360201	CF, 200 ohm

U501 SERVO & LOGIC PW UNIT 70191944

RF01	24360104	CF, 100k ohm
RF02	24360124	CF, 120k ohm
RF03	24360103	CF, 10k ohm
RF04	24360334	CF, 330k ohm
RF05	24360332	CF, 3.3k ohm
RF06	24360334	CF, 330k ohm
RF07	24360682	CF, 6.8k ohm
RF08	24360103	CF, 10k ohm
RF09	24360154	CF, 150k ohm
RF10	24360224	CF, 220k ohm
RF11	24360153	CF, 15k ohm
RF12, RF13	24360223	CF, 22k ohm
RF14	24378222	CF, 2.2k ohm
RF15	24378182	CF, 1.8k ohm, ±2%
RF16	24360224	CF, 220k ohm
RF17	24360122	CF, 1.2k ohm
RF18	24360562	CF, 5.6k ohm
RF19	24360564	CF, 560k ohm
RF20	24360122	CF, 1.2k ohm
RF21	24360183	CF, 18k ohm
RF22	24360102	CF, 1k ohm
RF23	24360562	CF, 5.6k ohm
RF24	24360123	CF, 12k ohm
RF25	24360183	CF, 18k ohm
RF26	24360221	CF, 220 ohm
RF27	24360105	CF, 1M ohm
RF28	24360472	CF, 4.7k ohm
RF29	24360103	CF, 10k ohm
RF30	24360104	CF, 100k ohm
RF31	24360123	CF, 12k ohm
RF32	24360104	CF, 100k ohm
RF33	24360823	CF, 82k ohm

UX01 TIMER & LOGIC CONTROL PW UNIT 70191946

RL01	24360271	CF, 270 ohm
RL02	24360223	CF, 22k ohm
RL03	24360331	CF, 330 ohm
RL04	24360223	CF, 22k ohm
RL05	24360511	CF, 510 ohm
RL06	24360331	CF, 330 ohm
RL07	24360361	CF, 360 ohm

U501 SERVO & LOGIC PW UNIT 70191944

RL61	24360272	CF, 2.7k ohm
RL62	24360392	CF, 3.9k ohm
RL63	24360103	CF, 10k ohm
RL67	24360472	CF, 4.7k ohm
RL69	24360103	CF, 10k ohm
RL71	24360223	CF, 22k ohm
RL72	24360103	CF, 10k ohm
RL73, RL73	24360273	CF, 27k ohm
RL75	24360243	CF, 24k ohm
RL76	24360104	CF, 100k ohm
RL81	24360104	CF, 100k ohm
RL84	24360223	CF, 22k ohm
RL85	24360472	CF, 4.7k ohm
RL86, RL87 RL88	24360472	CF, 4.7k ohm
RL91	24360122	CF, 1.2k ohm
RL92	24552272	OMF, 2.7k ohm, 1/2W
RL93	24360473	CF, 47k ohm
RL94	24360104	CF, 100k ohm
RL99	24360103	CF, 10k ohm

UX01 TIMER & LOGIC CONTROL PW UNIT 70191946

RX01	24360911	CF, 910 ohm
RX02	24360131	CF, 130 ohm
RX03	24360332	CF, 3.3k ohm

LOCATION NUMBER	PART NUMBER	DESCRIPTION
RX04	24360331	CF, 330 ohm
RX05	24360332	CF, 3.3k ohm
RX06	24360103	CF, 10k ohm
RX07	24360102	CF, 1k ohm
RX08	24360142	CF, 1.4k ohm
RX09	24360333	CF, 33k ohm
RX10	24360103	CF, 10k ohm
RX11	24360102	CF, 1k ohm
RX12	24360105	CF, 1M ohm
RX13	24360822	CF, 8.2k ohm
RX14	24360512	CF, 5.1k ohm
RX15	24360103	CF, 10k ohm
RX16	24360752	CF, 7.5k ohm
RX17	24360102	CF, 1k ohm
RX18, RX19	24360399	CF, 3.9 ohm

UX02 POWER SWITCH PW UNIT 70191961

RX21	24360271	CF, 270 ohm
RX22	24360752	CF, 7.5k ohm
RX23	24360153	CF, 15k ohm

COILS AND TRANSFORMERS

U001 PIF. SELECTOR & POWER 2 PW UNIT 70191942

L001	23262951	Coil RF Choke, TRF1019
L002	23261985	Coil, RF Choke, TRF9221
L003	23262856	Coil, TRF1452, PIF
L004	23262853	Coil, TRF1454, PIF
L005	23262852	Coil, TRF1455, AFT
L006	23283150	Coil, Peaking, TRF4150JG
L007	23283470	Coil, Peaking, TRF4470JG
L008	23283120	Coil, Peaking, TRF4120JG
L009	70256001	Coil, LA01, SIF

U201 VIDEO & AUDIO PW UNIT 70191943

L101	23283479	Coil, Peaking, TRF4479JG
L102	23283221	Coil, Peaking, TRF4221JG
L103	23283829	Coil, Peaking, TRF4829JG
L104	70215829	Coil, Peaking
L105	23283121	Coil, Peaking, TRF4121JG
L106	23283102	Coil, Peaking, TRF4102JG
L107	23283100	Coil, Peaking, TRF4100JG
L108	23283470	Coil, Peaking, TRF4470JG
L109, L110	23283109	Coil, Peaking, TRF4109JG
L201	23283829	Coil, Peaking, TRF4829JG
L202, L203	23283151	Coil, Peaking, TRF4151JG
L204	23283330	Coil, Peaking, TRF4330JG
L205, L206	23283820	Coil, Peaking, TRF4820JG
L207	23283330	Coil, Peaking, TRF4330JG
L208	23283180	Coil, Peaking, TRF4180JG
L209	23283151	Coil, Peaking, TRF4151JG
L210	23283829	Coil, Peaking, TRF4829JG
L211	23283560	Coil, Peaking, TRF4560JG
L301	23283472	Coil, Peaking, TRF4472JG

LOCATION NUMBER	PART NUMBER	DESCRIPTION
L401	23283680	Coil, Peaking, TRF4680JG
L402	23283241	Coil, Peaking, TRF4241JG
L403	23283829	Coil, Peaking, TRF4829JG
L404, L405	23283121	Coil, Peaking, TRF4121JG
L406	23283330	Coil, Peaking, TRF4330JG
L407	23283479	Coil, Peaking, TRF4479JG
L408	23283181	Coil, Peaking, TRF4181JG
L409	23283151	Coil, Peaking, TRF4151JG
L410	23283390	Coil, Peaking, TRF4390JG
L451, L452	70252034	Coil, Comb, Filter, Adjust, TR
L701	23283391	Coil, Peaking, TRF 4391JG
T201	70252033	Coil, TRV033
T701	70214002	Oscillator, Transformer, 65 kHz

U501 SERVO & LOGIC PW UNIT 70191944

L501	70212030	Coil, LGA01

U801 POWER PW UNIT 70191945

⚠T801	23211997	Line Filter, TRF3004C

TRNASISTORS

U001 PIF. SELECTOR & POWER 2 PW UNIT 70191942

Q001	A6708871	Transistor, 2SC388ATM FA
Q003	A3114869	Transistor, 2SK30ATM
Q004	A6534430	Transistor, 2SA1048-Y
Q006	A6332430	Transistor, 2SC2458-Y
Q007	A6534045	Transistor, 2SA1015-Y FA
Q008	A6534430	Transistor, 2SA1048-Y
Q009	A6332430	Transistor, 2SC2458-Y
Q010	A6534045	Transistor, 2SA1015-Y FA

U201 VIDEO & AUDIO PW UNIT 70191943

Q103, Q104	A6509141	Transistor, 2SA562TM-Y FA
Q105	A6534430	Transistor, 2SA1048-Y
Q106	A6342200	Transistor, 2SC2878
Q107	A6332430	Transistor, 2SC2458-Y
Q108, Q109	A6534430	Transistor, 2SA1048-Y
Q110, Q111 Q112, Q113	A6332430	Transistor, 2SC2458-Y
Q204, Q205	A6534430	Transistor, 2SA1048-Y
Q206, Q207	A6332430	Transistor, 2SC2458-Y
Q208, Q209 Q210	A6534430	Transistor, 2SA1048-Y
Q211, Q212 Q213	A6332430	Transistor, 2SC2458-Y
Q214	A6534430	Transistor, 2SA1048-Y
Q215, Q216 Q218	A6534430	Transistor, 2SA1048-Y
Q219, Q220 Q221	A6332430	Transistor, 2SC2458-Y

LOCATION NUMBER	PART NUMBER	DESCRIPTION
Q403, Q404 Q405, Q406 Q407, Q408 Q409, Q410 Q411, Q412	A6332430	Transistor, 2SC2458-Y
U501 SERVO & LOGIC PW UNIT 70191944		
Q504, Q505 Q508, Q509 Q510, Q511 Q512	A6332430	Transistor, 2SC2458-Y
Q513	A6534430	Transistor, 2SA1048-Y
Q514, Q515 Q516, Q517 Q518	A6332430	Transistor, 2SC2458-Y
Q519	A6534430	Transistor, 2SA1048-Y
Q520	A6332430	Transistor, 2SC2458-Y
Q522, Q523	A6534430	Transistor, 2SA1048-Y
Q524	A6332430	Transistor, 2SC2458-Y
Q525	A6844100	Transistor, 2SD686
Q526	A6325540	Transistor, 2SC2236-Y, FA
Q527	A6332430	Transistor, 2SC2458-Y
Q528	A671666H	Transistor, 2SC496-Y
Q529	A6332430	Transistor, 2SC2458-Y
Q610, Q611	A6534430	Transistor, 2SA1048-Y
Q612	A6332430	Transistor, 2SC2458-Y
Q613	A6534430	Transistor, 2SA1048-Y
Q614, Q615	A6332430	Transistor, 2SC2458-Y
Q616	A6534430	Transistor, 2SA1048-Y
Q617, Q619 Q620, Q621 Q622, Q623 Q624, Q625 Q626, Q627 Q628, Q629 Q630, Q631 Q632, Q633 Q635, Q636 Q637	A6332430	Transistor, 2SC2458-Y
Q641	A6533240	Transistor, 2SA966-Y
Q642, Q643	A6332430	Transistor, 2SC2458-Y
Q651, Q652 Q653, Q654 Q655, Q656 Q657, Q658 Q661, Q662 Q663, Q664	A6533240	Transistor, 2SA966-Y
Q670	A6325540	Transistor, 2SC2236-Y, FA
Q671, Q672	A6841900	Transistor, 2SD549
Q673, Q674 Q675, Q676	A6332430	Transistor, 2SC2458-Y
U201 VIDEO & AUDIO PW UNIT 70191943		
Q703	A6332430	Transistor, 2SC2458-Y

LOCATION NUMBER	PART NUMBER	DESCRIPTION
Q704, Q705	A6325825	Transistor, 2SC2240-GR
Q706	A6533625	Transistor, 2SA970-GR
Q707	A6319302	Trasistor, 2SC1959-Y, FA
Q708, Q709 Q710	A6332430	Transistor, 2SC2458-Y
U801 POWER PW UNIT 70191945		
Q802	A6848520	Transistor, 2SD880-Y
Q802B	23850904	Washer, Insulating, AC327
Q802D	23740016	Nut, 2.6 mm
Q803, Q804	A6317547	Transistor, 2SC1815-Y, FA
Q805	A6848520	Transistor, 2SD880-Y
Q805B	23850904	Washer, Insulating, AC327
Q805D	23740016	Nut, 2.6 mm
Q806, Q807	A6533625	Transistor, 2SA970-GR
Q808	A6314446	Transistor, 2SC1627-Y, FA
Q809	A6533240	Transistor, 2SA966-Y
Q810	A6317547	Transistor, 2SC1815-Y, FA
Q811B	23850904	Washer, Insulating, AC327
Q811D	23740016	Nut, 2.6 mm
U001 PIF. SELECTOR & LOGIC PW UNIT 70191942		
Q861	A6841475	Transistor, 2SD525-Y
QA02	A6332430	Transistor, 2SC2458-Y
QA03	A6534430	Transistor, 2SA1048-Y
UX01 TIMER, LOGIC CONTROL PW UNIT 70191946		
QA82	A6332430	Transistor, 2SC2458-Y
QL01, QL02	A6534430	Transistor, 2SA1048-Y
QX02	A6317547	Transistor, 2SC1815-Y, FA
QX03, QX04 QX05	A6332430	Transistor, 2SC2458-Y
UX02 POWER SWITCH PW UNIT		
QX21	A6332430	Transistor, 2SC2458-Y
DIODE		
U001 PIF. SELECTOR POWER 2 PW UNIT 70191959		
D001	A7246711	Diode, 1S1555(TV)
U201 VIDEO & AUDIO PW UNIT 70191943		
D101, D102 D103, D201 D202, D203 D204, D205 D206, D207 D401	A7160570	Diode, 1SS176
U501 SERVO AND LOGIC PW UNIT 70191944		
D501, D502 D503, D504	A7246711	Diode, 1S1555(TV)

LOCATION NUMBER	PART NUMBER	DESCRIPTION
D505, D506	A7246711	Diode, 1S1555(TV)
D507, D508		
D509, D510		
D511, D512		
D513, D514		
D515, D516		
D517, D518		
D519	A7110261	Zener Diode, 05Z9.1X
D520, D521	A7246711	Diode, 1S1555(TV)
D522, D523		
D524, D601		
D602, D603		
D604, D605		
D696, D607		
D608, D609		
D610	A7110018	Diode, Zener, 05Z5.6Z
D612, D613	A7246711	Diode, 1S1555(TV)
D614, D615		
D616		
D617	A7109364	Zener Diode, 05Z3.6Z
D618, D619	A7246711	Diode, 1S1555(TV)
D620, D621		
D622, D623		
D624, D625		
D626, D627		
D628		

U201 VIDEO & AUDIO PW UNIT 70191943

D701, D702	A7160570	Diode, 1SS176
D703, D704		

U801 POWER PW UNIT 70191945

D801, D802	70115177	Diode, S3V10
	or	or
D803, D804	70115172	Diode, 30D1FC
D805	A7160570	Diode, 1SS176
D806	A7109242	Zener Diode, 05Z2.4X
D807	A7160570	Diode, 1SS176
D808	A7110360	Zener Diode, 05Z11 Z
D809, D811	A7160570	Diode, 1SS176
D813, D814	A7568521	Diode, 1S1885, FA
D815, D816		
D817		
D818	A7160570	Diode, 1SS176
D862	A7275400	Diode, 1S2462
D863, D864	A7110664	Zener Diode, 05Z24Y
D866	A7110463	Zener Diode, 05Z13Z
D867	A7110463	Zener Diode, 05Z13Z
D868	A7110208	Zener Diode, 05Z8.2Y

U001 PIF. SELECTOR POWER 2 PW UNIT 70191959

DA01, DA02	A7246653	Diode, 1S1554 (TV)
DA03, DA04		
DA05, DA06		
DA07, DA08		

LOCATION NUMBER	PART NUMBER	DESCRIPTION
DA09	23115922	Zener Diode, μPC574J
DA10	A7246711	Diode, 1S1555(TV)
DA11	A7110208	Zener Diode, 05Z8.2Y
DA12, DA13	A7246653	Diode, 1S1554 (TV)
DA14, DA15		
DA16, DA17		
DA18, DA19		

UX01 TIMER & LOGIC CONTROL PW UNIT 70191946

DA81	A8605679	LED, TLG113A (FA)
DA82, DA83	A8605679	LED, TLG113A (FA)
DA84, DA85		
DA86, DA87		
DA88		
DA89, DA90	A7160570	Diode, 1SS176
DA91, DA92		
DA92, DA93		
DA93, DA94		
DA95, DA96		
DL02, DL04	A8605679	LED, TLG113A (FA)
DL05		
DL07	A8600607	LED, TLR113
DL09	A8605679	LED, TLG113A (FA)
DL12	A8600607	LED, TLR113
DX01	A7110042	Zener Diode, 05Z5.1Z
DX02, DX03	A7160570	Diode, 1SS176
DX04, DX05		
DX06, DX07		
DX08	A7246711	Diode, 1S1555(TV)
DX10	A7160570	Diode, 1SS176

UX02 POWER SWITCH PW UNIT 70191961

DX21	A8605679	LED, TLG113A (FA)

INTEGRATED CIRCUIT

U001 PIF. SELECTOR & POWER 2 PW UNIT 70191959

IC002	B0354710	IC, TA7607AP
IC005	B0325290	IC, TA7337P

U201 VIDEO & AUDIO PW UNIT 70191943

IC101	B0325300	IC, TA7339P
IC102	B0356720	IC, TA7672P
IC201	B0356940	IC, TA7693P
IC202	B0325420	IC, TA7350P
IC301	B0357700	IC, TA7723P
IC401	B0357730	IC, TA7726P
IC402	B0357690	IC, TA7722P

LOCATION NUMBER	PART NUMBER	DESCRIPTION
U501 SERVO & LOGIC PW UNIT 70191944		
IC501	B0430810	IC, TM4217P
IC502,IC503	B0351500	IC, TA75902P
IC601	B0403539	IC, TMP4320P-6205
IC602	B0403647	IC, TMP4310-3323
U201 VIDEO & AUDIO PW UNIT 70191943		
IC701	B0312560	IC, TA7137P (Y-C)
IC702	B0325080	IC, TA7325P
U801 POWER PW UNIT 70191945		
IC811	B0372540	IC, TA78005AP
UX01 TIMER & LOGIC CONTROL PW UNIT 70191946		
ICA81	B0275005	IC, TD62501 P
ICX1	B0405575	IC, TCP4633BN-9916

CIRCUIT BOARD ASSEMBLIES

MODULE UNIT AND CIRCUIT BOARD ASSEMBLIES

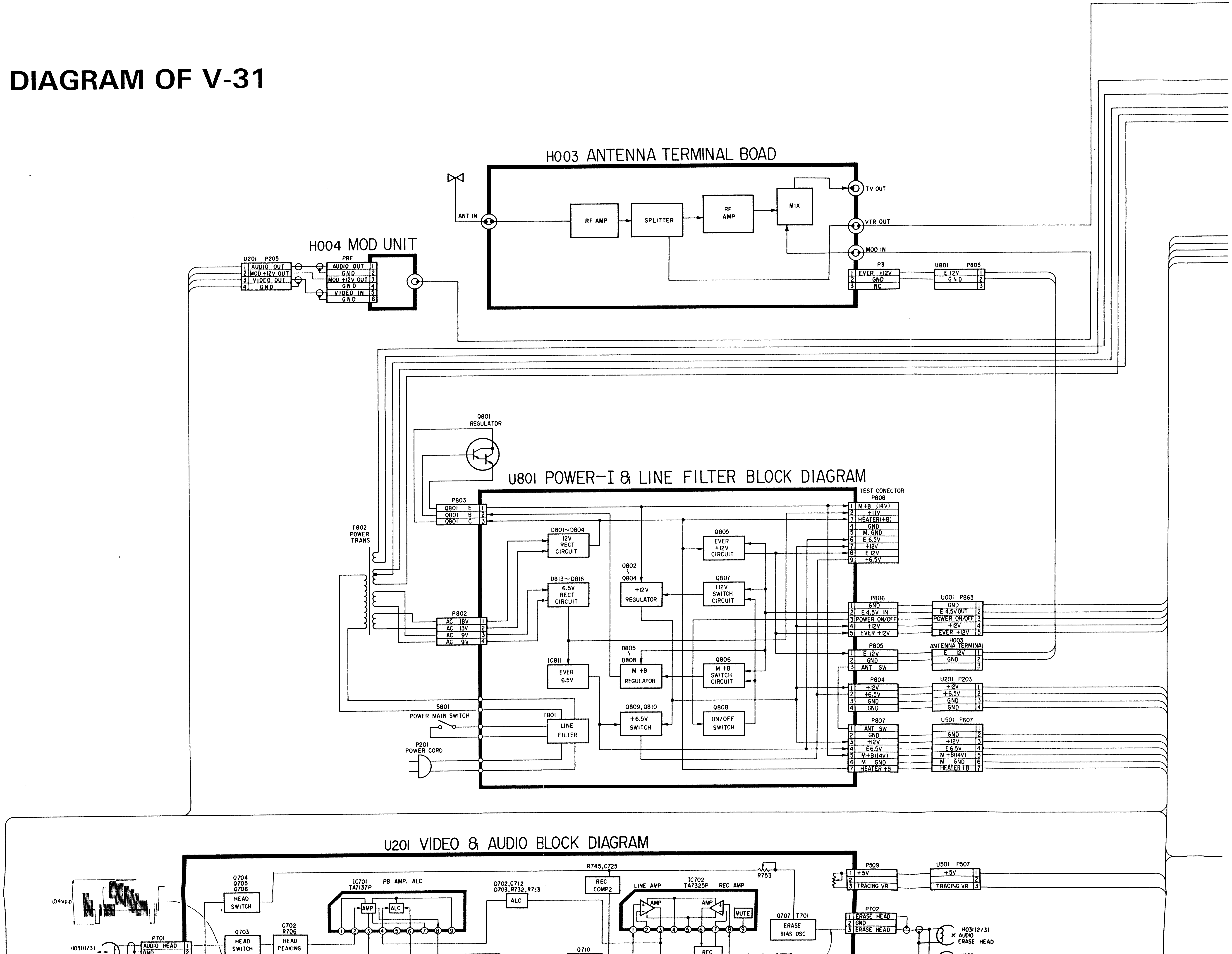
U001	70191959	PC Board Assy, PIF. SELECTOR & POWER 2
U201	70191943	PC Board Assy, Video & Audio
U501	70191944	PC Board Assy, Servo & Logic
U801	70191945	PC Board Assy, Power
UX01	70191946	PC Board Assy, Timer & Logic Control
UX02	70191961	PC Board Assy, Power Switch

MISCELLNEOUS

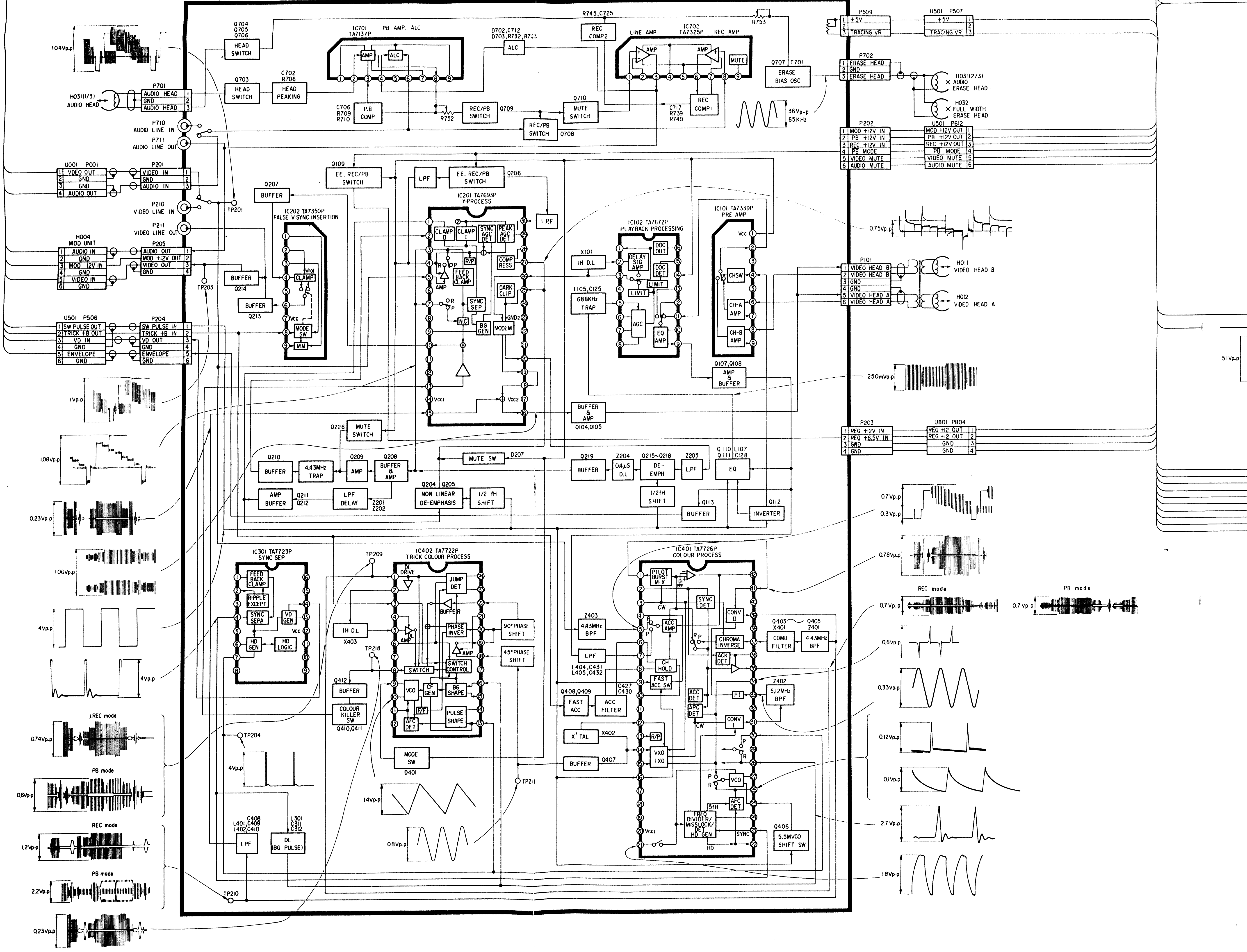
UX01 TIMER & LOGIC CONTROL PW UNIT 70191946		
DA81A	70843021	Holder, LED CH IND
DL02A	70862018	Holder, LED
DL04A	70862018	Holder, LED
DL05A	70862018	Holder, LED
DL07A	70862018	Holder, LED
DL09A	70862018	Holder, LED
DL12A	70843048	Holder, LED
DX21A	70862018	Holder, LED
U801 POWER PW UNIT 70191945		
⚠F801	23144125	Fuse, 500 mA
⚠F801A	23165102	Holder, Fuse
⚠F802	23144129	Fuse, 2AT
⚠F802A	23165102	Holder, Fuse
⚠F803	23144129	Fuse, 2AT
⚠F803A	23165102	Holder, Fuse

LOCATION NUMBER	PART NUMBER	DESCRIPTION
U001 PIF. SELECTOR & POWER 2 PW UNIT 70191959		
⚠F861	23144163	Fuse, 0.315AT
⚠F861A	23165102	Holder, Fuse
UX01 TIMER, LOGIC CONTROL PW UNIT 70191946		
C661, C662 C663, C664	24094554	CD, 1000pF
C671, C672	71591473	PF, 0.47μF
GX01	70113043	FIP. Timer, FIP5CM10
GX01A	70843047	Holder, FIP
U001 PIF. SELECTOR & POWER 2 PW UNIT 70191959		
S001	70145197	Switch, 1C1P
UX02 POWE SWITCH PW UNIT 70191961		
SL01	70145200	Tact Switch, KHH1090
UX01 TIMER, LOGIC CONTROL PW UNIT 70191946		
SL02, SL03 SL04, SL05 SL07, SL09	70145200	Tact Switch, KHH10902
UX01 TIMER & LOGIC CONTROL PW UNIT 70191946		
SX02, SX03 SX04, SX05 SX06, SX07 SX08	70145200	Tact Switch, KHH10902
U201 VIDEO & AUDIO PW UNIT 70191943		
X101	70138011	1H Delay Line
X401	70138013	2H Delay Line
X402	23153979	Crystal, 4.43MHz
U501 SERVO & LOGIC PW UNIT 70191944		
X501	70153029	2.986
U001 PIF. SELECTOR & POWER 2 PW UNIT 70191959		
Z001	23107959	Filter, PIF, F1035
Z002	23107972	Ceramic Video Trap, 5.5MHz
Z003	23107947	Ceramic Filter, 5.5MHz
U201 VIDEO & AUDIO PW UNIT 701919143		
Z201	70132076	Filter, LC802B
Z202	70132077	Delay Line, DL401E
Z203	70132023	Filter, LC.660A
Z204	70132077	Delay Line, DL401E
Z401	70132081	Filter, LC854
Z402	70153022	Filter, Ceramic, 5.12 MHz
Z403	70132080	Filter, LC730D

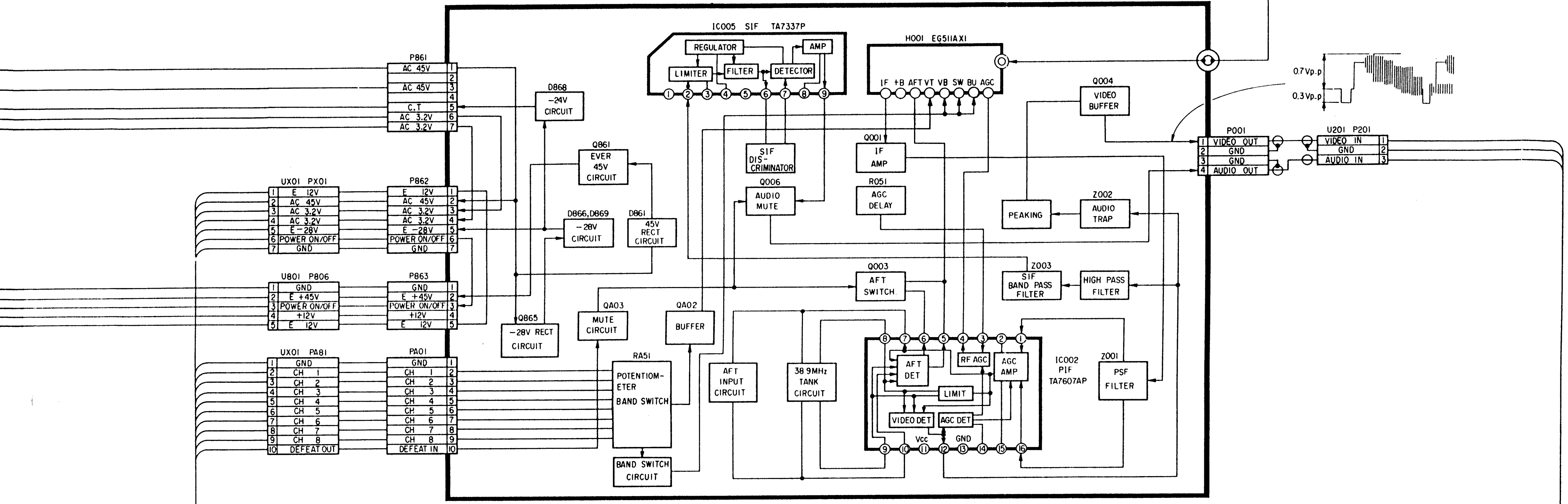
BLOCK DIAGRAM OF V-31


H003 ANTENNA TERMINAL BOAD
ANT IN
RF AMP
SPLITTER
RF AMP
MIX
TV OUT
VTR OUT
MOD IN
P3
1 EVER +12V
2 GND
3 NC
U801 P805
E 12V 1
GND 2
3
H004 MOD UNIT
U201 P205
1 AUDIO OUT
2 MOD+12V OUT
3 VIDEO OUT
4 GND
PRF
AUDIO OUT 1
GND 2
MOD +12V OUT 3
GND 4
VIDEO IN 5
GND 6
Q801 REGULATOR
U801 POWER-I & LINE FILTER BLOCK DIAGRAM
P803
Q801 E 1
Q801 B 2
Q801 C 3
T802 POWER TRANS
D801~D804
12V RECT CIRCUIT
D813~D816
6.5V RECT CIRCUIT
P802
AC 18V 1
AC 13V 2
AC 9V 3
AC 9V 4
IC811
EVER 6.5V
S801 POWER MAIN SWITCH
P201 POWER CORD
T801
LINE FILTER
Q802 ~ Q804
+12V REGULATOR
D805 ~ D808
M +B REGULATOR
Q809, Q810
+6.5V SWITCH
Q805
EVER +12V CIRCUIT
Q807
+12V SWITCH CIRCUIT
Q806
M +B SWITCH CIRCUIT
Q808
ON/OFF SWITCH
TEST CONECTOR
P808
1 M+B (14V)
2 +11V
3 HEATER(+B)
4 GND
5 M. GND
6 E 6.5V
7 +12V
8 E 12V
9 +6.5V
P806
1 GND
2 E 4.5V IN
3 POWER ON/OFF
4 +12V
5 EVER +12V
U001 P863
GND 1
E 4.5V OUT 2
POWER ON/OFF 3
+12V 4
EVER +12V 5
P805
1 E 12V
2 GND
3 ANT SW
H003 ANTENNA TERMINAL
E 12V 1
GND 2
3
P804
1 +12V
2 +6.5V
3 GND
4 GND
U201 P203
+12V 1
+6.5V 2
GND 3
GND 4
P807
1 ANT SW
2 GND
3 +12V
4 E6.5V
5 M+B(14V)
6 M GND
7 HEATER +B
U501 P607
1
GND 2
+12V 3
E 6.5V 4
M +B(14V) 5
M GND 6
HEATER +B 7
U201 VIDEO & AUDIO BLOCK DIAGRAM
1.04Vp-p
Q704 Q705 Q706
HEAD SWITCH
Q703
HEAD SWITCH
C702 R706
HEAD PEAKING
H031(1/3)
P701
AUDIO HEAD 1
GND 2
IC701 TA7137P
PB AMP. ALC
AMP
ALC
D702, C712 D703, R732, R733
ALC
R745, C725
REC COMP2
Q710
LINE AMP
IC702 TA7325P
REC AMP
AMP
AMP
MUTE
REC
R753
Q707 T701
ERASE BIAS OSC
P509
1 +5V
2
3 TRACING VR
U501 P507
+5V 1
2
TRACING VR 3
P702
1 ERASE HEAD
2 GND
3 ERASE HEAD
H031(2/3) AUDIO ERASE HEAD

U201 VIDEO & AUDIO BLOCK DIAGRAM

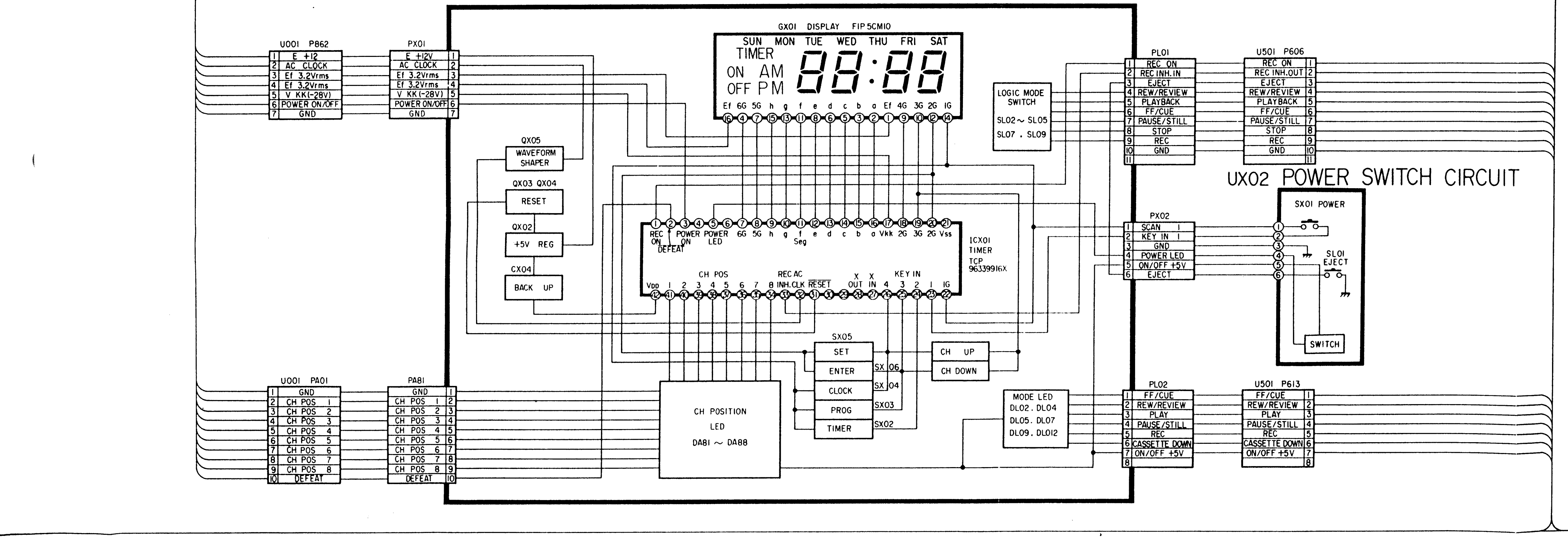

1.04Vp.p
H031(1/3)
AUDIO HEAD
P701
AUDIO HEAD
GND
AUDIO HEAD
P710
AUDIO LINE IN
P711
AUDIO LINE OUT
U001 P001
VIDEO OUT
GND
GND
AUDIO OUT
P201
VIDEO IN
GND
AUDIO IN
P210
VIDEO LINE IN
P211
VIDEO LINE OUT
H004
MOD UNIT
AUDIO IN
GND
MOD 12V IN
GND
VIDEO IN
GND
P205
AUDIO OUT
MOD +12V OUT
VIDEO OUT
GND
U501 P506
SW PULSE OUT
TRICK +B OUT
VD IN
GND
ENVELOPE
GND
P204
SW PULSE IN
TRICK +B IN
VD OUT
GND
ENVELOPE
GND
TP201
TP203
Q704
Q705
Q706
HEAD SWITCH
Q703
HEAD SWITCH
C702
R706
HEAD PEAKING
IC701 TA7137P
PB AMP. ALC
AMP
ALC
C706
R709
R710
P.B COMP
R752
D702,C712
D703,R732,R733
ALC
REC/PB SWITCH
Q709
REC/PB SWITCH
Q708
MUTE SWITCH
Q710
R745,C725
REC COMP2
R753
LINE AMP
IC702 TA7325P
REC AMP
MUTE
REC COMP1
C717
R739
R740
Q707 T701
ERASE BIAS OSC
36Vp-p
65KHz
P509
+5V
TRACING VR
U501 P507
+5V
TRACING VR
P702
ERASE HEAD
GND
ERASE HEAD
H031(2/3)
AUDIO ERASE HEAD
H032
FULL WIDTH ERASE HEAD
P202
MOD +12V IN
PB +12V IN
REC +12V IN
PB MODE
VIDEO MUTE
AUDIO MUTE
U501 P612
MOD +12V OUT
PB +12V OUT
REC +12V OUT
PB MODE
VIDEO MUTE
AUDIO MUTE
Q109
EE. REC/PB SWITCH
LPF
EE. REC/PB SWITCH
Q206
Q207
BUFFER
IC202 TA7350P
FALSE V-SYNC INSERTION
Vref
CLAMP
Vcc
MODE SW
MM
BUFFER
Q214
BUFFER
Q213
IC201 TA7693P
Y-PROCESS
CLAMP
CLAMP
SYNC AGC DET
PEAK AGC DET
L.PF
AMP
R/P
FEED BACK CLAMP
COMP RESS
DARK CLIP
SYNC SEP
NC
BG GEN
MODEM
GND2
Vcc1
Vcc2
IC102 TA7672P
PLAYBACK PROCESSING
X101
1H D.L
DELAY SIG AMP
DOC OUT
DOC DET
LIMIT
LIMIT
L105,C125
688KHz TRAP
AGC
EQ AMP
IC101 TA7339P
PRE AMP
Vcc
CHSW
CH-A AMP
CH-B AMP
0.75Vp.p
P101
VIDEO HEAD B
VIDEO HEAD B
GND
GND
VIDEO HEAD A
VIDEO HEAD A
H011
VIDEO HEAD B
H012
VIDEO HEAD A
Q107,Q108
AMP & BUFFER
250mVp.p
BUFFER & AMP
Q104,Q105
P203
REG +12V IN
REG +6.5V IN
GND
GND
U801 P804
REG +12 OUT
REG +12 OUT
GND
GND
Q228
MUTE SWITCH
Q210
BUFFER
4.43MHz TRAP
Q209
AMP
Q208
BUFFER & AMP
MUTE SW
D207
Q204 Q205
NON LINEAR DE-EMPHASIS
1/2 fH SHIFT
AMP BUFFER
Q211
Q212
LPF DELAY
Z201
Z202
Q219
BUFFER
Z204
0.4μS D.L
Q215~Q218
DE-EMPH
Z203
LPF
Q110 L107
Q111 C128
EQ
1/2fH SHIFT
Q113
BUFFER
Q112
INVERTER
1Vp.p
1.08Vp.p
0.23Vp.p
1.06Vp.p
4Vp.p
4Vp.p
REC mode
0.74Vp.p
PB mode
0.6Vp.p
REC mode
1.2Vp.p
PB mode
2.2Vp.p
0.23Vp.p
IC301 TA7723P
SYNC SEP
FEED BACK CLAMP
RIPPLE EXCEPT
SYNC SEPA
VD GEN
Vcc
HD GEN
HD LOGIC
TP209
IC402 TA7722P
TRICK COLOUR PROCESS
DL DRIVE
JUMP DET
BUFFER
1H D.L
X403
AMP
PHASE INVER
AMP
TP218
SWITCH
SWITCH CONTROL
90° PHASE SHIFT
45° PHASE SHIFT
Q412
BUFFER
VCO
CF GEN
BG SHAPE
F/F
PULSE SHAPE
AFC DET
COLOUR KILLER SW
Q410,Q411
MODE SW
D401
TP204
4Vp.p
TP211
14Vp.p
0.8Vp.p
L406
L401,C409
L402,C410
LPF
L301
C311
C312
DL (BG PULSE)
TP210
IC401 TA7726P
COLOUR PROCESS
PILOT BURST MIX
SYNC DET
CW
CONV II
Z403
4.43MHz BPF
ACC AMP
CHROMA INVERSE
Q403 Q405
X401 Z401
COMB FILTER
4.43MHz BPF
ACK DET
LPF
L404,C431
L405,C432
CH HOLD
FAST ACC SW
C427
C430
Q408,Q409
FAST ACC
ACC FILTER
ACC DET
APC DET
P.I
Z402
5.12MHz BPF
CONV I
X' TAL
X402
R/P
VXO IXO
BUFFER
Q407
VCO
AFC DET
5fH
FREQ DIVIDER/ MISSLOCK/ DET HD GEN
SYNC
HD
Vcc1
Q406
5.5MVCO SHIFT SW
0.7Vp.p
0.3Vp.p
0.78Vp.p
REC mode
PB mode
0.7Vp.p
0.7Vp.p
0.8Vp.p
0.33Vp.p
0.12Vp.p
0.1Vp.p
2.7Vp.p
1.8Vp.p
5.1Vp.p

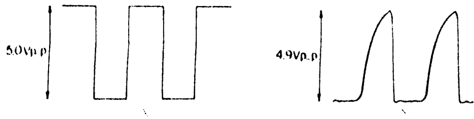
U001 PIF·SELECTOR & POWER-II BLOCK DIAGRAM

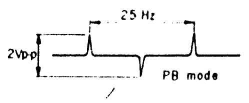

P861
AC 45V
AC 45V
C.T
AC 3.2V
AC 3.2V
UX01 PX01
E 12V
AC 45V
AC 3.2V
AC 3.2V
E -28V
POWER ON/OFF
GND
P862
E 12V
AC 45V
AC 3.2V
AC 3.2V
E -28V
POWER ON/OFF
GND
U801 P806
GND
E +45V
POWER ON/OFF
+12V
E 12V
P863
GND
E +45V
POWER ON/OFF
+12V
E 12V
UX01 PA81
GND
CH 1
CH 2
CH 3
CH 4
CH 5
CH 6
CH 7
CH 8
DEFEAT OUT
PA01
GND
CH 1
CH 2
CH 3
CH 4
CH 5
CH 6
CH 7
CH 8
DEFEAT IN
D868
-24V CIRCUIT
Q861
EVER 45V CIRCUIT
D866,D869
-28V CIRCUIT
D861
45V RECT CIRCUIT
Q865
-28V RECT CIRCUIT
QA03
MUTE CIRCUIT
QA02
BUFFER
RA51
POTENTIOM-ETER
BAND SWITCH
BAND SWITCH CIRCUIT
IC005 SIF TA7337P
REGULATOR
AMP
LIMITER
FILTER
DETECTOR
SIF DIS-CRIMINATOR
Q006
AUDIO MUTE
H001 EG511AX1
IF +B AFT VT VB SW BU AGC
Q001
IF AMP
R051
AGC DELAY
Q004
VIDEO BUFFER
PEAKING
Z002
AUDIO TRAP
Q003
AFT SWITCH
Z003
SIF BAND PASS FILTER
HIGH PASS FILTER
AFT INPUT CIRCUIT
38.9MHz TANK CIRCUIT
AFT DET
RF AGC
AGC AMP
LIMIT
VIDEO DET
AGC DET
Vcc
GND
IC002
PIF
TA7607AP
Z001
PSF FILTER
P001
VIDEO OUT
GND
GND
AUDIO OUT
U201 P201
VIDEO IN
GND
AUDIO IN
0.7Vp-p
0.3Vp-p

UX01 TIMER & LOGIC CONTROL BLOCK DIAGRAM

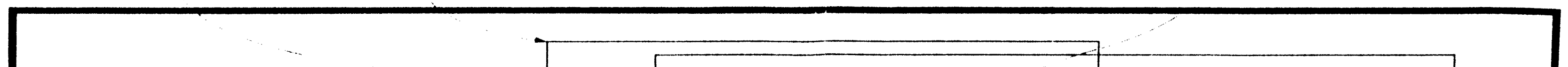
UX02 POWER SWITCH CIRCUIT

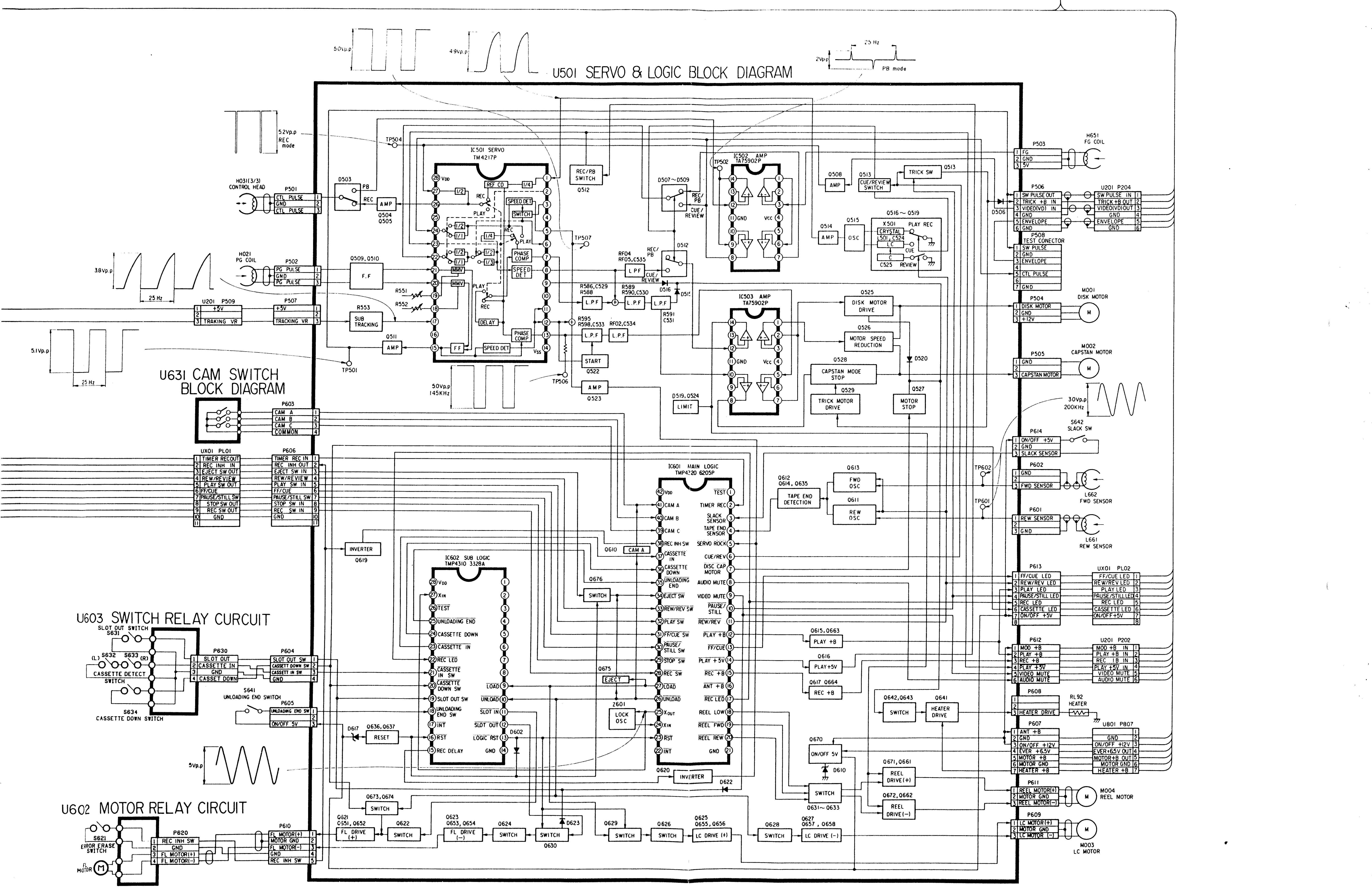

U001 P862
E +12
AC CLOCK
Ef 3.2Vrms
Ef 3.2Vrms
V KK(-28V)
POWER ON/OFF
GND
PX01
E +12V
AC CLOCK
Ef 3.2Vrms
Ef 3.2Vrms
V KK(-28V)
POWER ON/OFF
GND
GX01 DISPLAY FIP5CM10
SUN MON TUE WED THU FRI SAT
TIMER
ON AM
OFF PM
88:88
Ef 6G 5G h g f e d c b a Ef 4G 3G 2G 1G
QX05
WAVEFORM SHAPER
QX03 QX04
RESET
QX02
+5V REG
CX04
BACK UP
REC ON
DEFEAT
POWER ON
POWER LED
6G 5G h g f e d c b a Vkk 2G 3G 2G Vss
Seg
ICX01
TIMER
TCP
96339916X
VDD
CH POS 1 2 3 4 5 6 7 8
REC INH.
AC CLK
RESET
X OUT
X IN
KEY IN 4 3 2 1
1G
LOGIC MODE SWITCH
SL02 ~ SL05
SL07 . SL09
PL01
REC ON
REC INH. IN
EJECT
REW/REVIEW
PLAYBACK
FF/CUE
PAUSE/STILL
STOP
REC
GND
U501 P606
REC ON
REC INH. OUT
EJECT
REW/REVIEW
PLAYBACK
FF/CUE
PAUSE/STILL
STOP
REC
GND
PX02
SCAN 1
KEY IN 1
GND
POWER LED
ON/OFF +5V
EJECT
SX01 POWER
SL01
EJECT
SWITCH
SX05
SET
ENTER
CLOCK
PROG
TIMER
SX06
SX04
SX03
SX02
CH UP
CH DOWN
U001 PA01
GND
CH POS 1
CH POS 2
CH POS 3
CH POS 4
CH POS 5
CH POS 6
CH POS 7
CH POS 8
DEFEAT
PA81
GND
CH POS 1
CH POS 2
CH POS 3
CH POS 4
CH POS 5
CH POS 6
CH POS 7
CH POS 8
DEFEAT
CH POSITION LED
DA81 ~ DA88
MODE LED
DL02. DL04
DL05. DL07
DL09. DL012
PL02
FF/CUE
REW/REVIEW
PLAY
PAUSE/STILL
REC
CASSETTE DOWN
ON/OFF +5V
U501 P613
FF/CUE
REW/REVIEW
PLAY
PAUSE/STILL
REC
CASSETTE DOWN
ON/OFF +5V



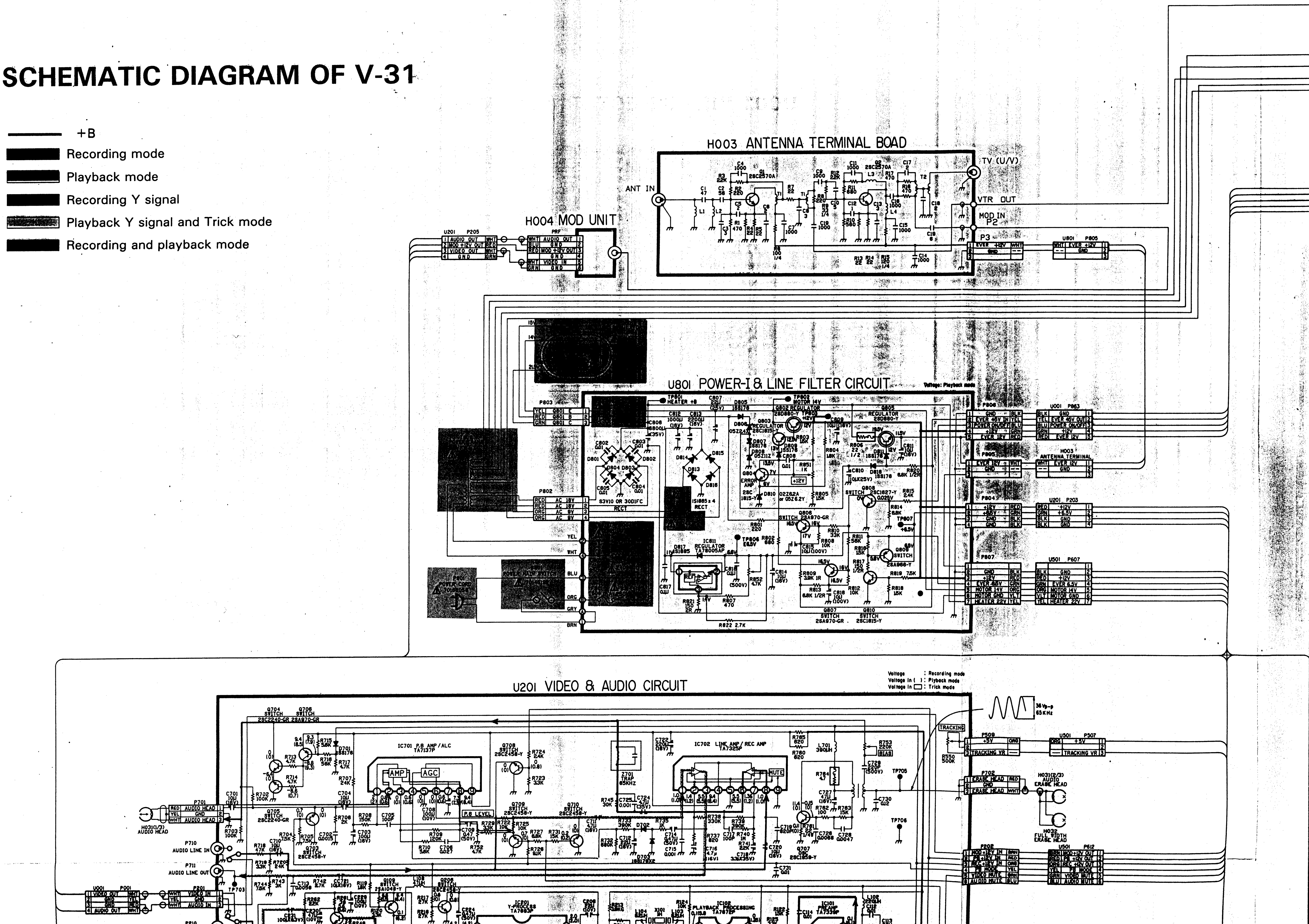


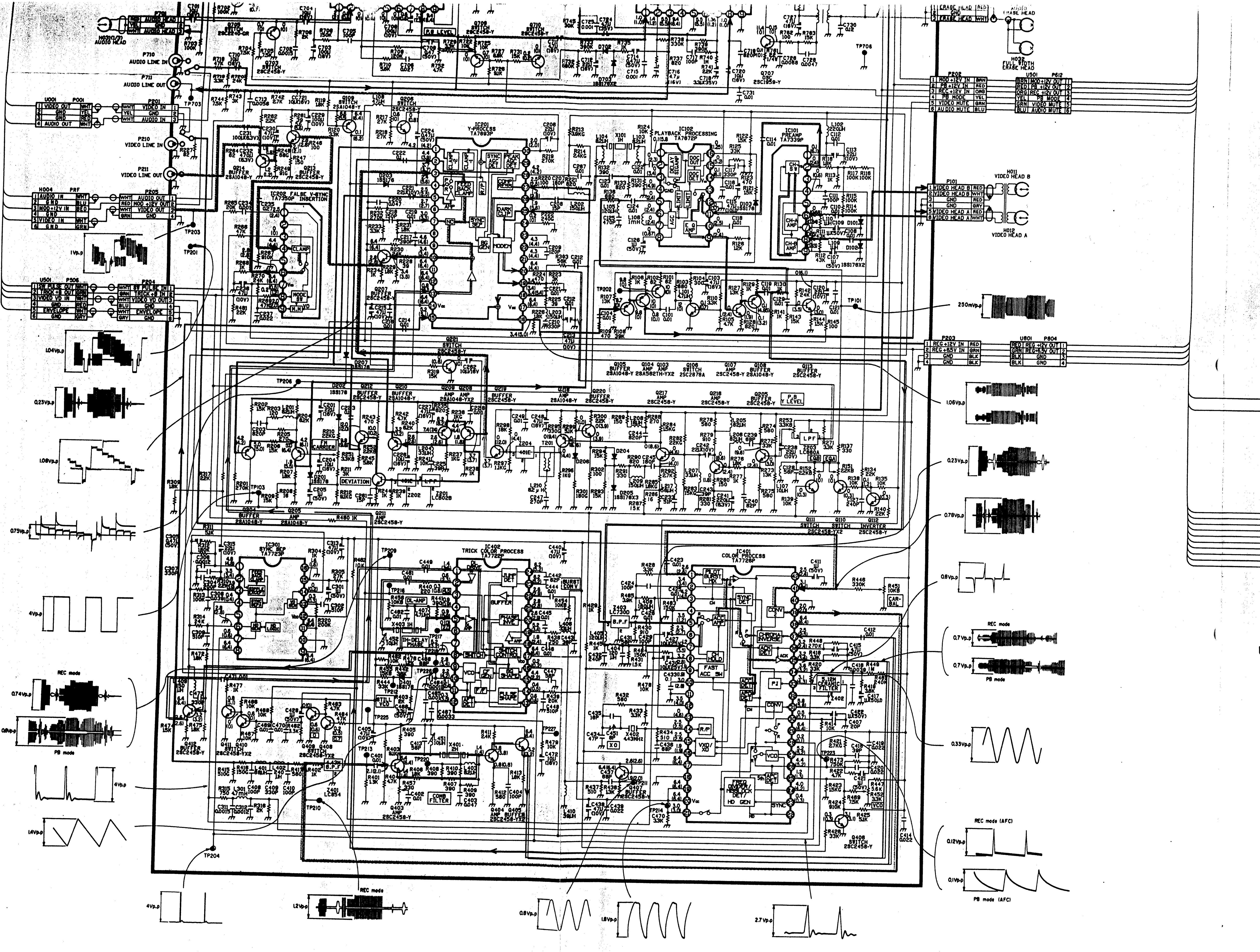
U501 SERVO & LOGIC BLOCK DIAGRAM



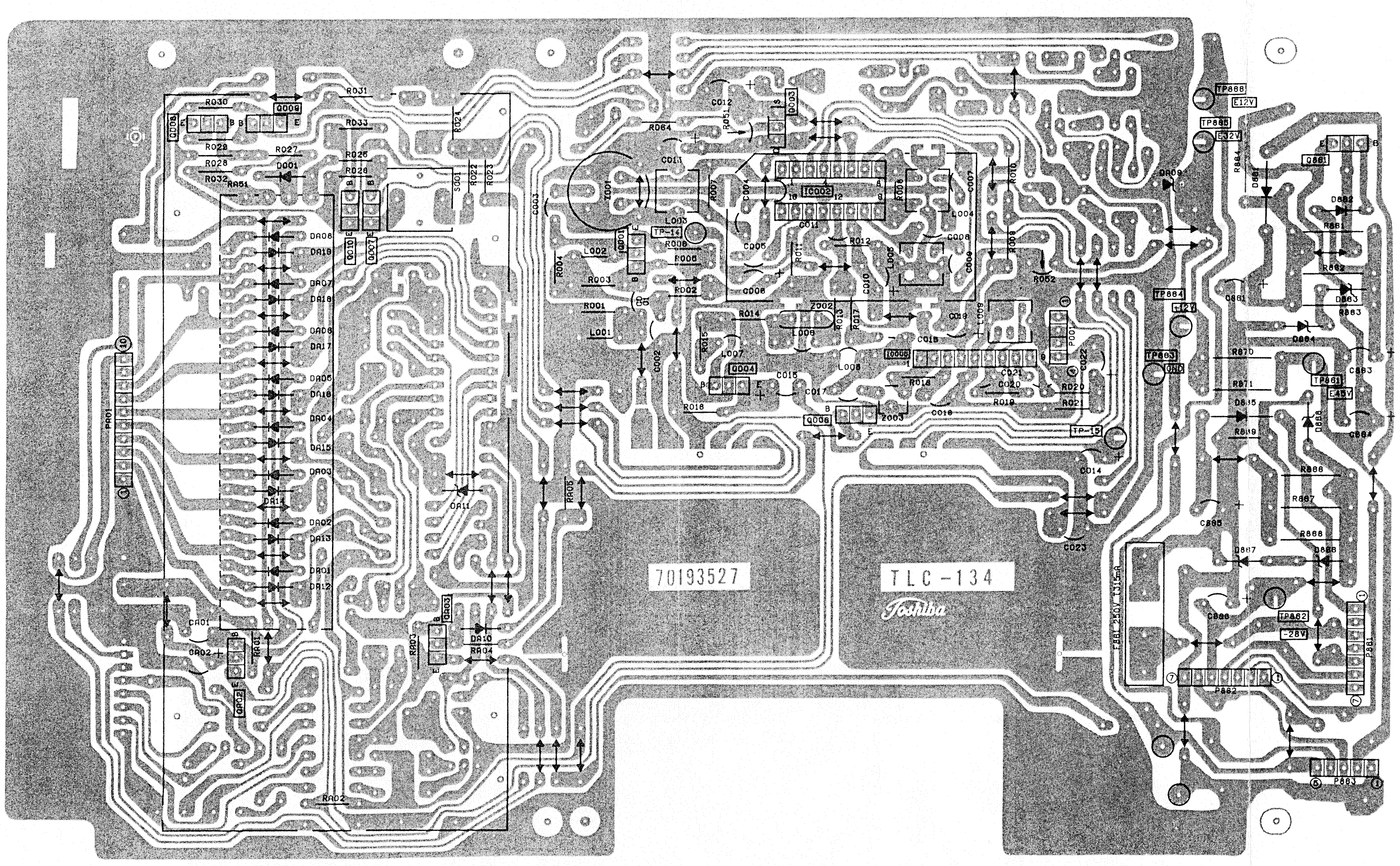

U501 SERVO & LOGIC BLOCK DIAGRAM
U631 CAM SWITCH BLOCK DIAGRAM
U603 SWITCH RELAY CURCUIT
U602 MOTOR RELAY CIRCUIT
IC501 SERVO TM4217P
IC502 AMP TA75902P
IC503 AMP TA75902P
IC601 MAIN LOGIC TMP4320 6205P
IC602 SUB LOGIC TMP4310 3328A
H031(3/3) CONTROL HEAD
H021 PG COIL
H651 FG COIL
P501
P502
P503
P504
P505
P506
P507
P508 TEST CONECTOR
P509
P601
P602
P603
P604
P605
P606
P607
P608
P609
P610
P611
P612
P613
P614
P620
P630
CTL PULSE
GND
PG PULSE
TRAKING VR
TRACKING VR
+5V
FG
5V
SW PULSE OUT
TRICK +B IN
VIDEO(VD) IN
ENVELOPE
SW PULSE
CTL PULSE
DISK MOTOR
+12V
CAPSTAN MOTOR
M001 DISK MOTOR
M002 CAPSTAN MOTOR
M003 LC MOTOR
M004 REEL MOTOR
U201 P204
SW PULSE IN
TRICK +B OUT
VIDEO(VD)OUT
U201 P509
U201 P202
UX01 PL01
UX01 PL02
U801 P807
D503
PB
REC
AMP
Q504
Q505
Q509, Q510
F.F
R551
R552
R553
SUB TRACKING
Q511
TP501
TP504
TP506
TP507
TP502
TP601
TP602
REC/PB SWITCH
Q512
D507~D509
REC/PB
CUE/REVIEW
D512
Q508
Q513
CUE/REVIEW SWITCH
TRICK SW
Q514
Q515
OSC
Q516~Q519
X501
CRYSTAL
L501, C524
LC
C
C525
PLAY
CUE
REVIEW
D506
REF CD
1/4
1/2
1/1
SPEED DET
SWITCH
PHASE COMP
SPEED DET
MMV
DELAY
FF
VDD
VSS
VCC
RF04
RF05, C535
L.P.F
R586, C529
R588
R589
R590, C530
R591
C531
D516
D515
R595
R598, C533
RF02, C534
START
Q522
Q523
D519, Q524
LIMIT
Q525
DISK MOTOR DRIVE
Q526
MOTOR SPEED REDUCTION
Q528
CAPSTAN MODE STOP
Q529
TRICK MOTOR DRIVE
Q527
MOTOR STOP
D520
52Vp.p REC mode
50Vp.p
49Vp.p
2Vp.p
25 Hz
PB mode
38Vp.p
5.1Vp.p
50Vp.p 145KHz
30Vp.p 200KHz
5Vp.p
CAM A
CAM B
CAM C
COMMON
TIMER RECOUT
REC INH IN
EJECT SW OUT
REW/REVIEW
PLAY SW OUT
FF/CUE
PAUSE/STILL SW
STOP SW OUT
REC SW OUT
TIMER REC IN
REC INH OUT
EJECT SW IN
PLAY SW IN
STOP SW IN
REC SW IN
S642 SLACK SW
ON/OFF +5V
SLACK SENSOR
FWD SENSOR
REW SENSOR
L662 FWD SENSOR
L661 REW SENSOR
Q612 Q614, Q635
TAPE END DETECTION
Q613
FWD OSC
Q611
REW OSC
INVERTER
Q619
Q610
Q676
Q675
EJECT
Z601
LOCK OSC
TEST
TIMER REC
SLACK SENSOR
TAPE END SENSOR
SERVO ROCK
CUE/REV
DISC CAP MOTOR
AUDIO MUTE
VIDEO MUTE
PAUSE/STILL
REW/REV
PLAY +B
FF/CUE
PLAY +5V
REC +B
ANT +B
REC LED
REEL LOW
REEL FWD
REEL REW
REC INH SW
CASSETTE IN
CASSETTE DOWN
UNLOADING END
EJECT SW
REW/REV SW
PLAY SW
FF/CUE SW
PAUSE/STILL SW
STOP SW
REC SW
LOAD
UNLOAD
XOUT
XIN
RST
INT
UNLOADING END
CASSETTE DOWN
CASSETTE IN
REC LED
CASSETTE IN SW
CASSETTE DOWN SW
SLOT OUT SW
UNLOADING END SW
REC DELAY
SLOT IN
SLOT OUT
LOGIC RST
FF/CUE LED
REW/REV LED
PLAY LED
PAUSE/STILL LED
REC LED
CASSETTE LED
MOD +B
PLAY +B
REC +B
PLAY +5V
VIDEO MUTE
AUDIO MUTE
MOD +B IN
PLAY +B IN
REC +B IN
PLAY +5V IN
Q615, Q663
Q616
Q617 Q664
Q642, Q643
Q641
HEATER DRIVE
RL92 HEATER
ANT +B
ON/OFF +12V
EVER +6.5V
MOTOR +B
MOTOR GND
HEATER +B
EVER+6.5V OUT
MOTOR+B OUT
Q670
ON/OFF 5V
D610
Q631~Q633
Q671, Q661
REEL DRIVE(+)
Q672, Q662
REEL DRIVE(−)
REEL MOTOR(+)
REEL MOTOR(−)
LC MOTOR(+)
LC MOTOR(−)
Q620
Q622
D622
D617
Q636, Q637
RESET
D602
Q673, Q674
Q621
Q651, Q652
FL DRIVE (+)
Q623
Q653, Q654
FL DRIVE (−)
Q624
Q630
D623
Q629
Q626
Q625
Q655, Q656
LC DRIVE (+)
Q628
Q627
Q657, Q658
LC DRIVE (−)
SLOT OUT SWITCH S631
S632
S633
(L)
(R)
CASSETTE DETECT SWITCH
S634 CASSETTE DOWN SWITCH
SLOT OUT
CASSETTE IN
CASSET DOWN
SLOT OUT SW
CASSETT DOWN SW
CASSETT IN SW
S641 UNLOADING END SWITCH
UNLOADING END SW
ON/OFF 5V
S621 ERROR ERASE SWITCH
FL MOTOR
REC INH SW
FL MOTOR(+)
FL MOTOR(−)
M

SCHEMATIC DIAGRAM OF V-31

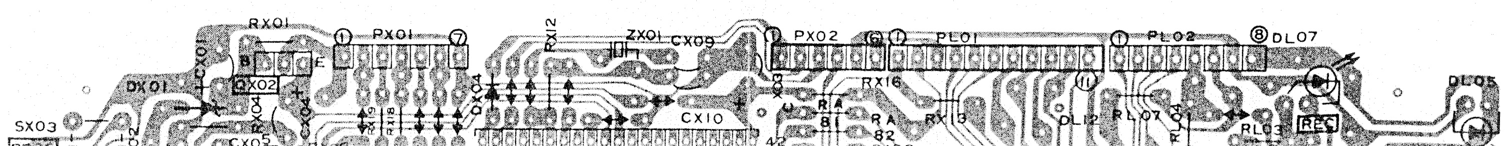

— +B
■ Recording mode
▨ Playback mode
■ Recording Y signal
▨ Playback Y signal and Trick mode
■ Recording and playback mode
H003 ANTENNA TERMINAL BOAD
ANT IN
TV (U/V)
VTR OUT
MOD IN
P2
P3
H004 MOD UNIT
U201 P205
AUDIO OUT
MOD +12V OUT
VIDEO OUT
GND
U801 POWER-I & LINE FILTER CIRCUIT
Voltage: Playback mode
TP801 HEATER +B
TP802 MOTOR 14V
Q802 REGULATOR 2SD880-Y
Q805 REGULATOR 2SD880-Y
IC811 REGULATOR TA78005AP
RECT
P802
P803
P804
P805
P806
P807
U001 P863
H003 ANTENNA TERMINAL
U201 P203
U501 P607
POWER CORD
POWER MAIN SWITCH
U201 VIDEO & AUDIO CIRCUIT
Voltage : Recording mode
Voltage in ( ) : Playback mode
Voltage in □ : Trick mode
36Vp-p 65KHz
IC701 P.B AMP/ALC TA7137P
AMP
AGC
IC702 LINE AMP / REC AMP TA7325P
MUTE
P.B LEVEL
TRACKING
P509
U501 P507
TRACKING VR
P702
ERASE HEAD
H031(2/3) AUDIO ERASE HEAD
H032 FULL WIDTH ERASE HEAD
P202
U501 P612
P701
AUDIO HEAD
H031(1/3) AUDIO HEAD
P710 AUDIO LINE IN
P711 AUDIO LINE OUT
TP703
TP705
TP706
U001 P001
P201
VIDEO OUT
VIDEO IN
AUDIO OUT
AUDIO IN
IC201 Y-PROCESS TA7683P
IC102 PLAYBACK PROCESSING TA7676P
IC101 PRE AMP TA7336P


P710 AUDIO LINE IN
P711 AUDIO LINE OUT
P210 VIDEO LINE IN
P211 VIDEO LINE OUT
U001 P001
P201
VIDEO OUT
VIDEO IN
AUDIO OUT
GND
H004 PRF
P205
AUDIO IN
MOD +12V IN
VIDEO IN
AUDIO OUT
MOD +12V OUT
VIDEO OUT
U501 P506
P204
SW PULSE OUT
TRICK +8 OUT
VIDEO VD OUT
ENVELOPE
SW PULSE IN
TRICK +8 IN
VIDEO VD IN
TP203
TP201
TP703
TP206
TP103
TP209
TP204
TP210
TP101
TP706
IC201 Y-PROCESS TA7683P
IC202 FALSE V-SYNC INSERTION TA7350P
IC102 PLAYBACK PROCESSING TA7672P
IC101 PREAMP TA7339P
IC301 SYNC SEP
IC402 TRICK COLOR PROCESS TA7722P
IC401 COLOR PROCESS TA7726P
P208
REC +12V IN
PB +12V IN
PB MODE
VIDEO MUTE
U501 P612
AUDIO MUTE
P101
VIDEO HEAD B
VIDEO HEAD A
H011 VIDEO HEAD B
H012 VIDEO HEAD A
H032 FULL WIDTH ERASE HEAD
ERASE HEAD
P203
REG +12V IN
REG +8.5V IN
U801 P804
REG +12V OUT
REG +8.5V OUT
Q221 SWITCH 2SC2458-Y
Q207 BUFFER 2SC2458-Y
Q214 BUFFER 2SA1048-Y
Q213 BUFFER 2SC2458-Y
Q209 AMP
Q208 AMP
Q219 BUFFER
Q218 AMP
Q220 BUFFER
Q217 AMP
Q216 AMP
Q205 BUFFER
Q105 BUFFER
Q104 AMP
Q103 AMP
Q106 SWITCH
Q107 AMP
Q108 BUFFER
Q113 BUFFER
Q111 SWITCH
Q110 SWITCH
Q112 INVERTER
Q304 BUFFER
Q305 AMP
Q211 AMP
Q412 BUFFER
Q410 SWITCH
Q409 SWITCH
Q408 SWITCH
Q403 AMP
Q404 AMP BUFFER
Q405 AMP BUFFER
Q407 BUFFER
Q406 SWITCH
CLAMP
MODE SW
FM CARRIER
DEVIATION
P.B LEVEL
P.B Y LEVEL
LPF
EQB
EQA
1H-DELAY PHASE
DL-AMP
DL DRIVE
BUFFER
PHASE INVE
BURST CONV
VCO
COMB FILTER
B.P.F
PILOT BURST MIX
SYNC DET
CONV
ACC AMP
FAST ACC SH
CHROMA INVERSE
ACK DET
APC DET
FREQ DIVIDER
HD GEN
CAR BAL
X0
VXO
R/P
1Vp.p
1.04Vp.p
0.23Vp.p
1.08Vp.p
0.75Vp.p
4Vp.p
REC mode
0.74Vp.p
0.8Vp.p
PB mode
1.4Vp.p
1.2Vp.p
0.8Vp.p
1.8Vp.p
2.7Vp.p
250mVp.p
1.06Vp.p
0.23Vp.p
0.78Vp.p
0.8Vp.p
0.7Vp.p
0.33Vp.p
REC mode (AFC)
0.12Vp.p
0.1Vp.p
PB mode (AFC)

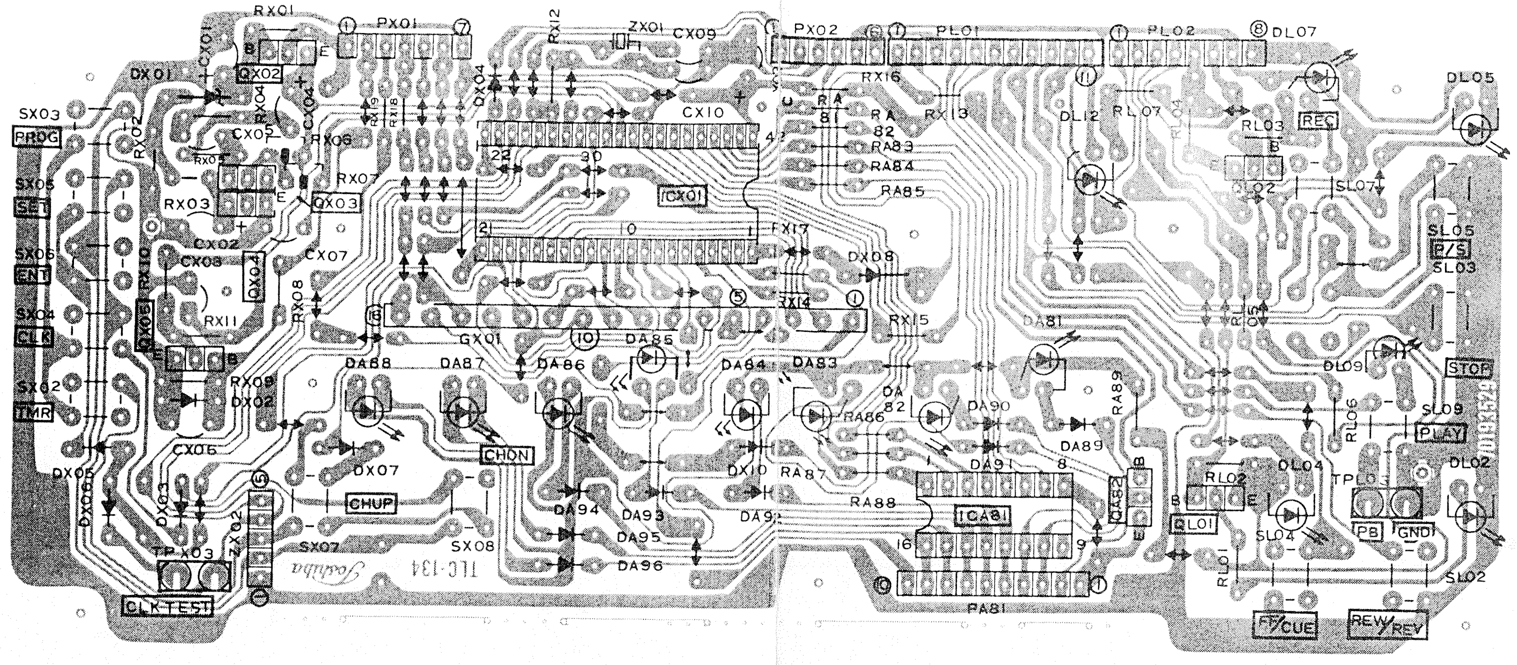
U001 PIF · SELECTOR & POWER 2


70193527
TLC-134
Toshiba
PA01
Q009
Q008
Q010
Q007
Q001
Q002
Q003
Q004
Q006
IC002
IC003
TP-14
TP-15
TP888
TP885
TP884
TP883
TP881
TP882
E12V
E32V
E45V
-28V
GND
P881
P882
P883
F881 250V 3.15A

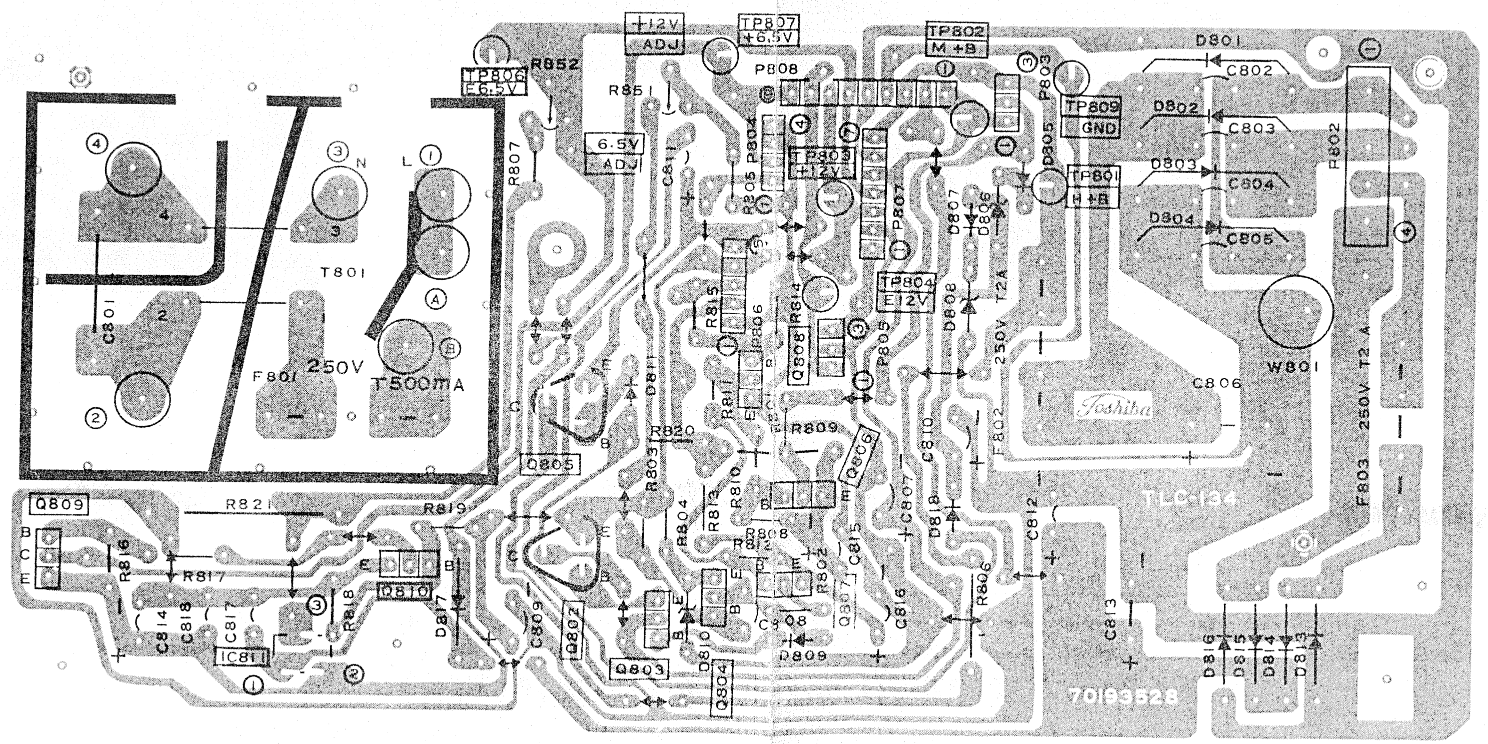
UX01 TIMER & LOGIC CONTROL


RX01
PX01
PX02
PL01
PL02
ZX01
CX09
CX10
DX01
SX03
DL07
DL05
RX16
RX13

UX01 TIMER & LOGIC CONTROL

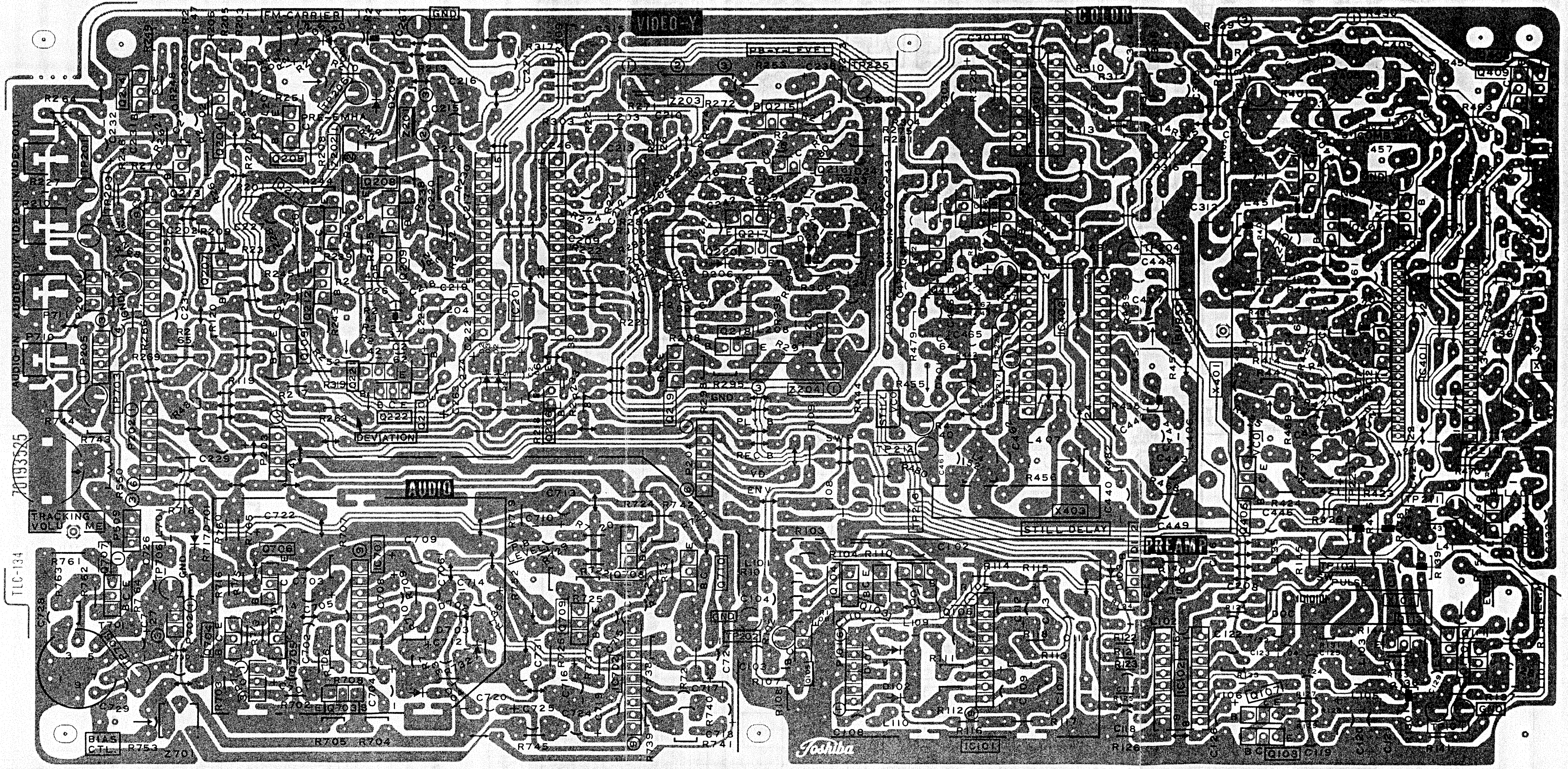

PROG
SET
ENT
CLK
TMR
CLKTEST
CHUP
CHDN
REC
P/S
STOP
PLAY
PB
GND
FF/CUE
REW/REV
ICX01
ICA81
CX10
PX01
PX02
PL01
PL02
PA81
TLC-134
Toshiba

U801 POWER

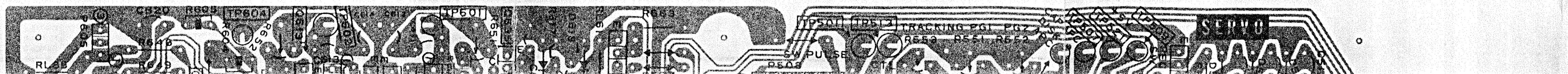

+12V ADJ
TP807 +6.5V
TP802 M+B
TP806 E6.5V
6.5V ADJ
TP803 +12V
TP809 GND
TP801 H+B
TP804 E12V
T801
F801 250V T500mA
F802 250V T2A
F803 250V T2A
W801
IC811
Toshiba
TLC-134
70193528

PRINTED WIRING BOARDS OF V-31

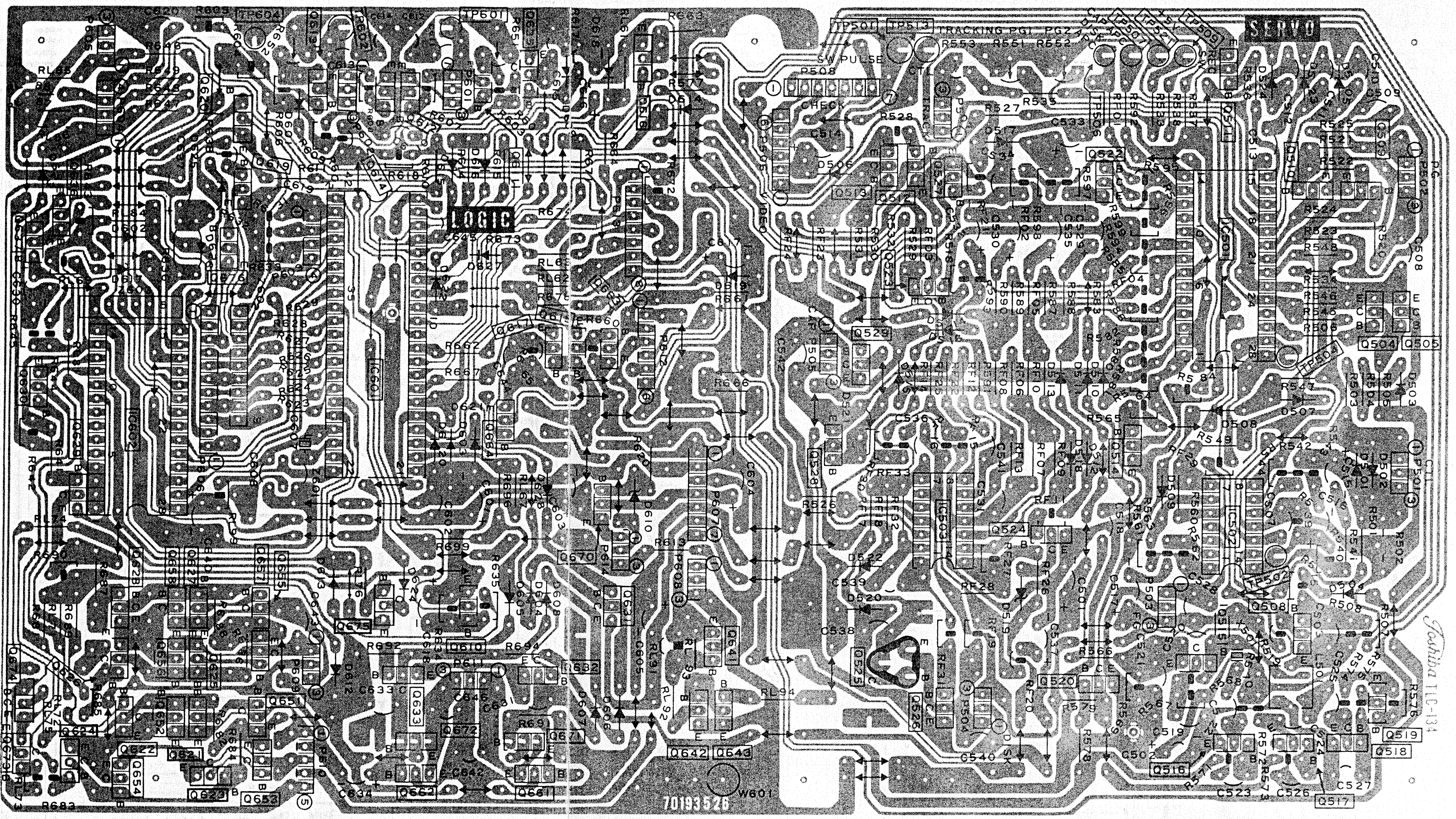
U201 VIDEO & AUDIO


FM CARRIER
GND
VIDEO-Y
PB-Y LEVEL
COLOR
PRE-EMPHA
VIDEO OUT
VIDEO IN
AUDIO OUT
AUDIO IN
DEVIATION
AUDIO
STILL DELAY
PREAMP
TRACKING VOL
BIAS CTL.
TLC-134
Toshiba
REC
ENV
IC101
Q109
X403
IC440

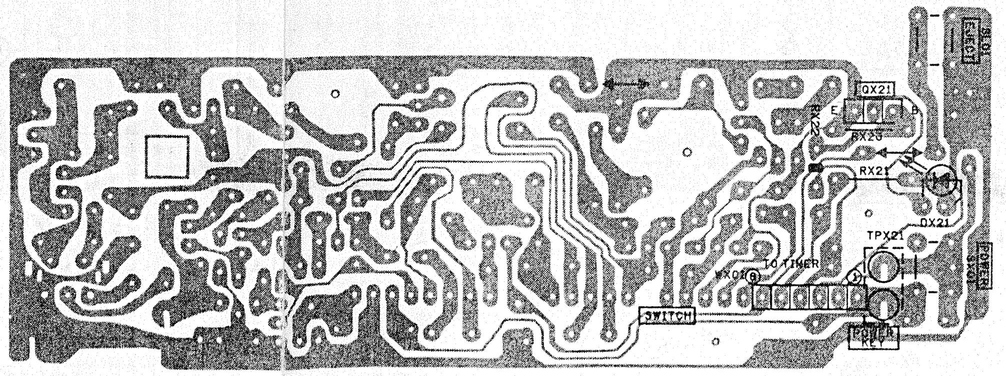
U501 SERVO & LOGIC

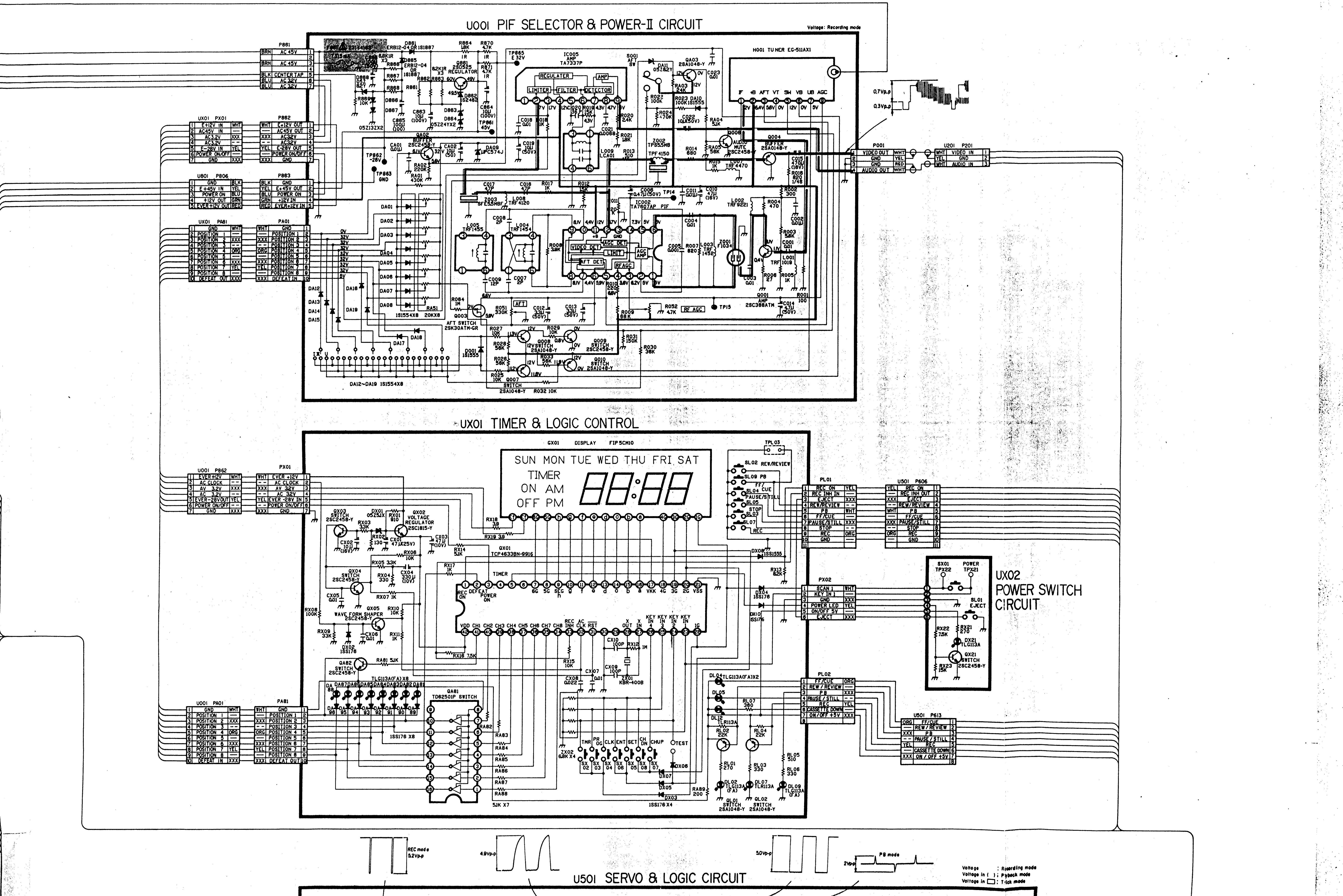

TP604
TP601
TP501
TP512
TRACKING PG1 PG2
SERVO
SW PULSE

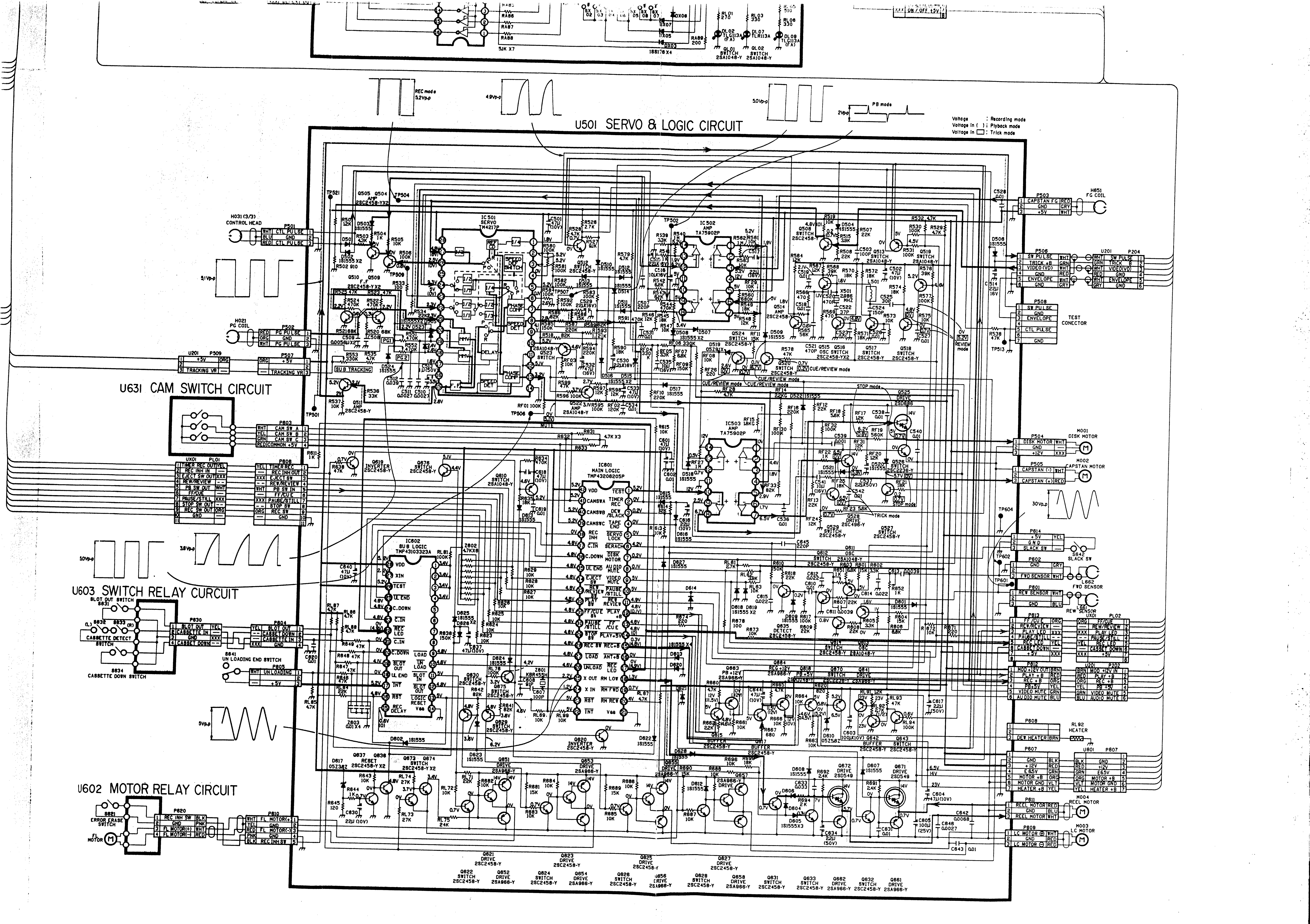
U501 SERVO & LOGIC


SERVO
LOGIC
TRACKING PG1 PG2
SW PULSE
CHECK
70193526
W601

UX02 POWER SWITCH


SWITCH
POWER
TO TIMER


U001 PIF SELECTOR & POWER-II CIRCUIT
Voltage: Recording mode
P861
P862
P863
UX01 PX01
U801 P806
UX01 PA81
PA01
IC005 AMP TA7337P
REGULATOR
AMP
LIMITER
FILTER
DETECTOR
H001 TUNER EG-511AX1
IF
+B
AFT
VT
SW
VB
UB
AGC
QA03 2SA1048-Y
Q006 AUDIO MUTE 2SC2458-Y
Q004 BUFFER 2SA1048-Y
P001
VIDEO OUT
GND
AUDIO OUT
U201 P201
VIDEO IN
AUDIO IN
0.7Vp-p
0.3Vp-p
IC002 TA7607AP PIF
VIDEO DET
AGC DET
LIMIT
AGC AMP
AFT DET
RF AGC
Z001 F1034
Q001 AMP 2SC388ATM
Q003 AFT SWITCH 2SK30ATM-GR
Q007 SWITCH 2SA1048-Y
Q008 SWITCH 2SA1048-Y
Q009 SWITCH 2SC2458-Y
Q010 SWITCH 2SA1048-Y
QA02 BUFFER 2SC2458-Y
Q881 2SD525 REGULATOR
DA01–DA08 1S1554X8
RA51 20KX8
DA12~DA19 1S1554X8
UX01 TIMER & LOGIC CONTROL
GX01 DISPLAY FIP5CM10
SUN MON TUE WED THU FRI SAT
TIMER
ON AM
OFF PM
U001 P862
PX01
QX01 TCP4633BN-9916
QX02 VOLTAGE REGULATOR 2SC1815-Y
QX03 SWITCH 2SC2458-Y
QX04 SWITCH 2SC2458-Y
QX05 WAVE FORM SHAPER 2SC2458-Y
QA82 SWITCH 2SC2458-Y
QA81 TD62501P SWITCH
TLG113A(FA)X8
1SS176 X8
ZX01 KBR-400B
TMR PR CLK ENT SET CH DN CH UP TEST
SL02 REW/REVIEW
SL09 PB
SL04 FF/CUE
PAUSE/STILL
SL05 STOP
SL03
SL07 REC
TPL03
PL01
U501 P606
REC ON
REC INH IN
EJECT
REW/REVIEW
PB
FF/CUE
PAUSE/STILL
STOP
REC
GND
PX02
SCAN 1
KEY IN 1
POWER LED
ON/OFF 5V
PL02
CASSETTE DOWN
ON/OFF +5V
U501 P613
U001 PA01
PA81
UX02 POWER SWITCH CIRCUIT
SX01 TPX22
POWER TPX21
SL01 EJECT
DX21 TLG113A
QX21 SWITCH 2SC2458-Y
QL01 SWITCH 2SA1048-Y
QL02 SWITCH 2SA1048-Y
DL04 TLG113A(FA)X2
1SS176 X4
5.1K X7
REC mode 5.2Vp-p
4.9Vp-p
5.0Vp-p
2Vp-p
PB mode
Voltage : Recording mode
Voltage in ( ) : Pyback mode
Voltage in ☐ : T-ick mode
U501 SERVO & LOGIC CIRCUIT


U501 SERVO & LOGIC CIRCUIT
U631 CAM SWITCH CIRCUIT
U603 SWITCH RELAY CURCUIT
U602 MOTOR RELAY CIRCUIT
Voltage : Recording mode
Voltage in ( ) : Plyback mode
Voltage in ▭ : Trick mode
REC mode 5.2Vp-p
4.9Vp-p
5.0Vp-p
2Vp-p
PB mode
5.1Vp-p
3.8Vp-p
5.0Vp-p
5Vp-p
30Vp-p
IC501 SERVO TM4217P
IC502 AMP TA75902P
IC503 AMP TA75902P
IC601 MAIN LOGIC TMP43206205P
IC602 SUB LOGIC TMP4310323A
H031 (3/3) CONTROL HEAD
H021 PG COIL
H651 FG COIL
P501
P502
P503 CAPSTAN FG
P504 DISK MOTOR
P505 CAPSTAN MOTOR
P506
P508 TEST CONECTOR
P509
P507
P603
P604
P605
P606
P607
P608 DEW HEATER
P609 LC MOTOR
P610
P611 REEL MOTOR
P612
P613
P614 SLACK SW
P801 REW SENSOR
P602 FWD SENSOR
P620
P630
M001 DISK MOTOR
M002 CAPSTAN MOTOR
M003 LC MOTOR
M004 REEL MOTOR
RL92 HEATER
L661 REW SENSOR
L662 FWD SENSOR
S642 SLACK SW
S631 SLOT OUT SWITCH
S632
S633
CASSETTE DETECT SWITCH
S634 CASSETTE DOWN SWITCH
S641 UN LOADING END SWITCH
S621 ERROR ERASE SWITCH
FL MOTOR
U201
U801
UX01
PL01
PL02
U202
P204
P202
P807
SPEED DET
PHASE COMP
DELAY
REF OSC
STOP mode
CUE/REVIEW mode
TRICK mode
REVIEW mode
MUTE
TP501
TP502
TP504
TP506
TP509
TP513
TP521
TP601
TP602
TP604
Q621 DRIVE 2SC2458-Y
Q622 SWITCH 2SC2458-Y
Q652 DRIVE 2SA966-Y
Q623 DRIVE 2SC2458-Y
Q624 SWITCH 2SC2458-Y
Q654 DRIVE 2SA966-Y
Q625 DRIVE 2SC2458-Y
Q626 SWITCH 2SC2458-Y
Q656 DRIVE 2SA966-Y
Q627 DRIVE 2SC2458-Y
Q628 SWITCH 2SC2458-Y
Q658 DRIVE 2SA966-Y
Q631 SWITCH 2SC2458-Y
Q633 SWITCH 2SC2458-Y
Q662 DRIVE 2SA966-Y
Q632 SWITCH 2SC2458-Y
Q661 DRIVE 2SA966-Y

LOCATION NUMBER	PART NUMBER	DESCRIPTION
U501 SERVO & LOGIC PW UNIT 70191944		
Z601	70153031	Ceramic Resonator, 455 kHz
Z602	70427014	Resistor Block, p8472M
Z603	24094863	Capacitor Block, 0.01μF × 4
U201 VIDEO & AUDIO PW UNIT 70191943		
Z701	70212019	Coil, 65 kHz, Trap
UX01 TIMER, LOGIC CONTROL PW UNIT 70191946		
ZX01	70153028	Ceramic Resonator,
ZX02	70427017	Resistor Black, P-4 682M
U001 PIF. SELECTOR & POWER 2 PW UNIT 70191959		
H001	70121029	Tuner, TN-EG511AX1

LOCATION NUMBER	PART NUMBER	DESCRIPTION
COMPONENTS NOT MOUNTED ON PA BOARDS		
Q801	A6841305	Transistor, 2SD524
⚠P801	70168060	Cord, 2p, 2.2mm, 2.5A Power
⚠P801A	70846044	Holder, Cord
H003	70142053	Antenna, VTU-VT614
H004	70123053	Modulator, MD5636T
S801	70145192	Switch, Seesaw
T802	70213083	Transformer, VPW31S, AC220V